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DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEARS 1988 AND 1989

HEARINGS

BEFORE THE

COMMITTEE ON ARMED SERVICES
UNITED STATES SENATE

ONE HUNDREDTH CONGRESS

FIRST SESSION

ON

S. 1174

AUTHORIZING APPROPRIATIONS FOR FISCAL YEARS 1988 AND 1989 FOR MILITARY ACTIVITIES OF THE DEPARTMENT OF DEFENSE, FOR MILITARY CONSTRUCTION, AND FOR DEFENSE ACTIVITIES OF THE DEPARTMENT OF ENERGY, TO PRESCRIBE PERSONNEL STRENGTHS FOR SUCH FISCAL YEARS FOR THE ARMED FORCES, AND FOR OTHER PURPOSES

PART 7

CONVENTIONAL FORCES AND ALLIANCE DEFENSE
MARCH 11, 1987

DEFENSE INDUSTRY AND TECHNOLOGY
MARCH 9, 16, 31; APRIL 9

PROJECTION FORCES AND REGIONAL DEFENSE
MARCH 18, 25; APRIL 1

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DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEARS 1988 AND 1989

WEDNESDAY, MARCH 11, 1987

U.S. Senate,
Subcommittee on Conventional
Forces and Alliance Defense,
Committee on Armed Services,
Washington, DC.

LONG-TERM PLANS FOR MAJOR EQUIPMENT ACQUISITION

The subcommittee met in open session, pursuant to notice, at 9:32 a.m., in room SR-232A, Russell Senate Office Building, Senator Carl Levin (chairman) presiding.

Present: Senators Levin, Dixon, Glenn, Gore, Shelby, Warner, Thurmond, Cohen, and Quayle.

Staff present: Arnold L. Punaro, staff director; Romie L. Bownlee, deputy minority staff director; Patrick A. Tucker, minority counsel; Richard D. Finn, Jr., John J. Hamre, George K. Johnson, Jr., David S. Lyles, and Daniel J. Wildfong, professional staff members; Pamela G. Powell, staff assistant.

Also present: Charles C. Smith, assistant to Senator Dixon; Milton D. Beach, assistant to Senator Glenn; Leon Fuerth, assistant to Senator Gore; James R. Sayer, assistant to Senator Wirth; Richard Roberts, assistant to Senator Shelby; Terrence Lynch, assistant to Senator Shelby; William J. Wight, assistant to Senator Warner; Dale F. Gerry, assistant to Senator Cohen; Henry D. Sokolski, assistant to Senator Quayle; Jay L. Kriss, assistant to Senator Wilson; and Alan Ptak, assistant to Senator Gramm.

OPENING STATEMENT OF SENATOR CARL LEVIN, CHAIRMAN

Senator Levin. Good morning everybody. This morning the Conventional Forces and Alliance Defense Subcommittee will receive testimony from the Department of the Army on the Army's master plan for the acquisition of major combat systems.

Last year the Congress directed the Army to conduct a comprehensive evaluation of its major combat systems. Under current plans the Army intends to terminate most of its major combat systems during the next 5 years. This is ironic, since the Chief of Staff of the Army testified before the Armed Services Committee last month that only a third of the Army's units have been modernized to date.

While only a fraction of the Army will have been modernized, the next generation of combat systems for the Army is not scheduled for procurement until the second half of the next decade, and that is likely to slip because of funding constraints.

I am afraid that we are prematurely ending several major combat systems before the long stated requirements in those systems are filled. We are ending them prior to the time that we are planning to initate procurement of follow-on systems.

Conventional defense is becoming more and more central to U.S. and European security. The nuclear deterrent has become less and less credible, as both the United States and the Soviet Union's nuclear inventories have grown so massive that use by either side is mutually suicidal.

The nuclear deterrent is also becoming less credible as we begin to negotiate away from the brink of the nuclear abyss and as we gradually eliminate and remove those weapons. As we decrease dependence on nuclear weapons, we increase dependence on our conventional forces and conventional deterrence moves closer to the heart of our security.

A credible conventional defense requires more than modernization of a third of the Army and a credible conventional defense seems inconsistent with premature termination of most of the Army's front line combat systems.

This hearing is designed to provide insights into this problem and explore alternatives to improve our conventional defenses. Our witness today is Gen. Maxwell Thurman, Vice Chief of Staff of the Army. We welcome you here, General.

General THURMAN. Thank you, sir.

Senator LEVIN. General Thurman is a familiar witness to the Armed Services Committee, having testified in numerous capacities over the years.

Before I turn it over to you for your statement, General, let me ask Senator Quayle whether or not he has an opening statement.

Senator QUAYLE. Mr. Chairman, congratulations. This is our first public hearing we have had on the Conventional Subcommittee, Conventional Forces and Alliance Defense. I want to congratulate you on your assumption of chairmanship.

You and I, we fixed the procurement world, so to speak.

Senator LEVIN. Whoops.

Senator QUAYLE. Or shall I say——

Senator LEVIN. The hearing is over.

Senator QUAYLE. Or should I say we screwed up the procurement world pretty well. Now let us see what we can do to the conventional area. You guys are really going to love us. I am sure you can not wait to see what we are going to do.

But I congratulate you and look forward to working with you. I think we have got a lot of issues before us. There are a lot of questions. One of the issues that always comes up is that balance between the conventional and strategic.

Unfortunately we have got defense budgets that are shrinking around here, not expanding. That makes it very, very difficult, particularly when we start prioritizing. So I look forward to these hearings. We have got a budget we have got to meet. We have to look at a lot of programs.

I also look forward to working with you. I know of your great interest in trying to perhaps follow on to what the full committee did on the strategies, and how we can really sit down and come up with a strategy, whether we are talking about the Army and then try to figure out the programs.

One of the problems that I have, and I know you have it too, and I think we talked about it, we get so bogged down in programmatic discussions, that we look at just the narrow picture, rather than first of all being able to focus on the big picture. And the big picture is what we have got to focus on. And then we can figure out what the parts and pieces are that ought to go into that.

So I look forward to the testimony today. I look forward to the witnesses who have been here before, very influential people who have a lot to say. I look forward to working with you and congratulate you. I will just insert my entire statement in the record, if that is all right.

[The prepared statement of Senator Quayle follows:]

PREPARED STATEMENT OF SENATOR DAN QUAYLE

Mr. Chairman, I commend you for scheduling this hearing today in order to examine more closely the Army's acquisition and modernization plans. We are aware that all the services are facing difficult choices regarding the acquisition of weapons and equipment for modernization versus readiness, sustainability and other requirements. The budgets enacted by Congress the past 2 years have clearly not provided sufficient funding to permit appropriate levels of modernization while at the same time providing for necessary personnel, readiness and operating costs.

The Army seems to be particularly hard hit by this situation. The Army's share of DOD procurement dollars has declined consistently since 1981 when they received 21% of DOD procurement funds. In fiscal year 1989 they are projected to receive just 16.3 percent. Clearly this is cause for concern. A recent front page article in the Washington Post entitled "GI's Waiting for New War Machines" featured field training of the U.S. Army's 1st Infantry Division at Fort Riley Kansas. These units are currently equipped with outdated M-60 tanks and M113 Personnel Carriers rather than the Army's new M1 Tank and M2/3 Bradley Fighting Vehicle.

While the Reagan build-up is the most ambitions undertaken in modern peacetime history, we are by no means close to completing the modernization of our forces. The Army, in fact has completed only about one third of its modernization program.

The money we have spent, however, has not been wasted and significant progress has been made. Both in the Pentagon and here on the Hill we have endeavored to structure defense budgets to achieve an appropriate balance between modernization and readiness.

A large portion of the budget has gone into recruiting and sustaining high quality soldiers capable of operating modern, sophisticated equipment.

Additional capabilities have been added to active and reserve units and Special Operating Forces.

War reserve stocks have been increased.

It is worth noting that during the past several years while the Army's share of the DOD procurement and R&D dollars has been declining, the Army's share of the total DOD budget has remained almost constant around 26 percent.

The problem is that over the past 2 years, we have simply not provided sufficient funding in the Defense budget to permit modernization of our forces while carrying out the other necessary functions at the same time. Thus we find ourselves stretching out and curtailing programs in ways which greatly increase the unit costs of those things we are buying.

This committee has already gone on record in favor of the President's Defense Budget request through letters sent to the chairman of the Budget Committee expressing support for the President's request of $312 billion for defense. Some in the Congress, I am sure, will consider this budget request too high. On the contrary—even if approved at the requested level, it is not enough to continue the modernization of our forces at a reasonable rate. Within this budget proposal of $312 billion, it is necessary to reduce the production rates for M-1 tanks from 840 to 600 tanks per year, Apache helicopters from 101 to 67 aircraft per year, and to terminate the Army's AHIP Scout Helicopter program.

Clearly, we must stand firmly on the $312 billion mark and fight for its approval on the floor and through the conference—understanding that any reduction from the President's request will delay further the modernization efforts which we began several years ago.

Mr. Chairman, I look forward to hearing from the Army on these issues.

Senator **Levin**. Thank you, Senator Quayle for your comments. I am particularly pleased that you are the ranking member of the subcommittee. We have worked together well and long and have put in a lot of time, and I think worked together extremely well as a team and again this year we will hopefully put our cooperative efforts to good use as we address the needs of our conventional forces.

We are delighted that Senator Shelby is on this subcommittee. I am wondering whether or not he might have any opening comments. If so, this is your moment.

Senator **Shelby**. My comments will be brief, Mr. Chairman. I too want to congratulate you on assuming the chairmanship of the subcommittee and also to my old friend, Senator Quayle. We were neighbors once upon a time when we were both in the House. I look forward to working with you on the subcommittee and on the committee.

You have shown already, one, you are going to work us hard, and that is good. Second, you are dedicated to finding out what we need and also to ensure that we have balance in our military. I am looking forward to General Thurman's testimony here today and I am sure we will all have questions then.

Senator **Levin**. Thank you, Senator Shelby. Senator Thurmond, our good friend and somebody who has got a lot of wisdom and even more seniority, if that is possible.

Senator **Thurmond**. Thank you. I want to congratulate you, Mr. Chairman. On the subcommittee you have a great opportunity here to do a lot of good.

I have three committees meeting this morning. One is Judiciary and the Foreign Relations concerning the treaty. Another is an anti-trust committee, so I am going to have to leave in a little bit. But I have a few questions I want to leave to be answered by my cousin here, General Thurman.

General **Thurman**. I have been trying to get my name changed so it is spelled like Senator Thurmond so I will be in good company.

Senator **Thurmond**. I do not know why your wing of the family ever changed it from the original anyway.

General **Thurman**. That is the reason we went to North Carolina instead of South Carolina.

Senator **Thurmond**. If you will please answer these few questions that I leave will the subcommittee.

Senator **Levin**. Thank you, Senator.

General **Thurman**. It is a pleasure to work with you, Mr. Chairman, and I am sure a lot can be accomplished.

Senator **Levin**. We appreciate your dropping by here this morning. We know the kind of schedule you have. But just the fact that you were able to get here for a moment or two means a great deal to us. Thank you.

General, we again are delighted you are here and you are free to make your statement. We will put the entire statement in the record if you choose to summarize it, but proceed as you wish.

STATEMENT OF GEN. MAXWELL R. THURMAN, VICE CHIEF OF STAFF, U.S. ARMY, ACCOMPANIED BY LT. GEN. LOUIS C. WAGNER, DEPUTY CHIEF OF STAFF, RESEARCH, DEVELOPMENT, AND ACQUISITIONS

General **Thurman**. Thank you, Mr. Chairman. I appreciate the opportunity to come before you. I brought with me my colleague, Lt. Gen. Louis C. Wagner, who is the Deputy Chief of Staff of Research, Development and Acquisitions. He has all the answers to all the questions. I am just the spokesperson here.

I would like to say to you, we really appreciate the committee's action of yesterday, which confirmed General Wagner's promotion to four star general, to head the Army Materiel Command. He will have a chance to execute all the procurements that you give us. So he is in the hot seat down the range here.

Senator **Levin**. We congratulate you and welcome you.

General **Wagner**. Thank you, sir.

General **Thurman**. I do have a statement which I would respectfully submit to be added to the record, and I would like to use a few charts to give us the opportunity for dialog. I request that they be appended to the record as well.

Senator **Levin**. They will.

General **Thurman**. May I have the first chart, please.

Congressional Requirements

Requires SecArmy to report on the Acquisition of Major Army Systems.
Specifically mentions Abrams, Bradley, MLRS, Blackhawk and Apache.
Report should address:
Requirement to retain an active production base;
Reevaluation of the procurement objective;
Feasible improvements to existing systems; and
Transition plan from the current system, thru block mods, to future planned systems.

First of all let me say we are here in response to the congressional requirement to look at the major systems, specifically, the production base, procurement objectives, and the acquisition plan which is due to be over here next week. It is on track.

Army Landpower—Conventional Forces

But also, strategic contribution:
Forward deployed;
Rapid enforcement;
Responsive force projection.
Soldier—on the ground—a strategic deterrent.

While we talk about conventional forces, the Army is an important part of the strategic equation, because it is forward-deployed. We also need the capability to rapidly reinforce. We have treaty commitments with the Europeans, for example, and where we do not have sufficient forces we need the capability to rapidly project force because a soldier on the ground is the greatest strategic deterrent.

ARMY MISSION NEEDS - BALANCED FORCES

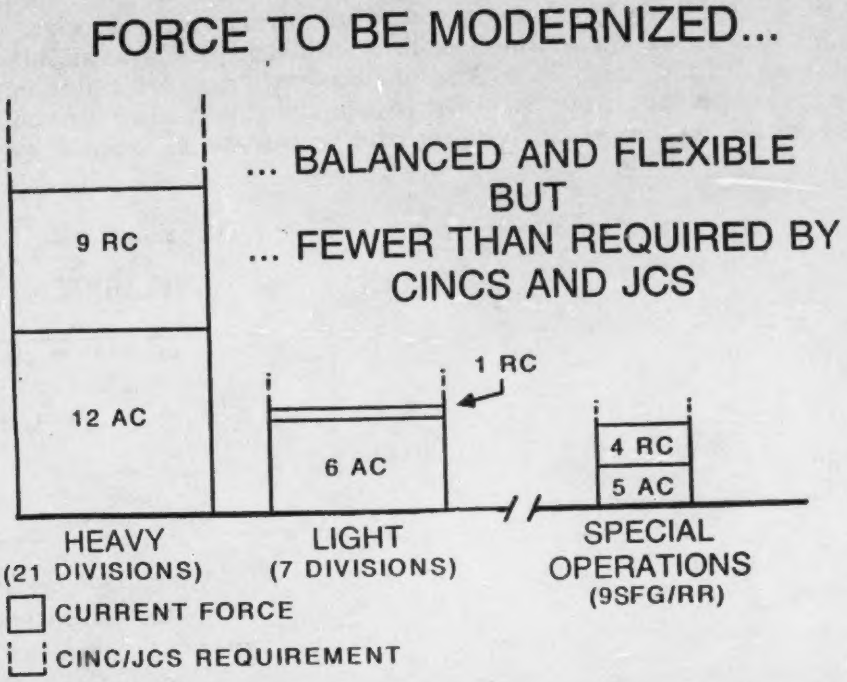
SOVIET QUANTITY -- QUALITY -- GLOBAL PERSPECTIVE

SOVIET UNION & SURROGATES	LOW INTENSITY & TERRORISM
- HEAVY FORCES -- CLOSE BATTLE	- LIGHT FORCES DEPLOYABILITY
- JOINT FORCES -- DEEP BATTLE	- SPECIAL OPERATIONS FORCES

RESPONSIVE INTELLIGENCE -- COMMAND & CONTROL

ARMY: ACTIVE, GUARD, RESERVE
JOINT AND COMBINED INTEGRATION
ALWAYS QUALITY SOLDIERS & FAMILY SUPPORT

Mission needs are balanced. The capabilities of the Soviet Union and its surrogates require that we have responsive intelligence, command and control in the Active, Guard, and Reserves, as well as the rest of our enterprise.



The forces to be modernized are 21 heavy divisions, seven in the light division category, and we show special operating forces here. I would call to your attention that these forces do not meet the requirements of the Chairman of the Joint Chiefs of Staff or the Commanders-in-Chief in the field. We do not have enough forces for everybody. Consequently, it is an apportionment and affordability exercise to meet the requirements.

ACQUISITION PRINCIPLES

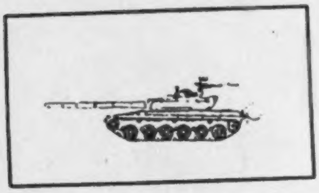
Doctrinally based equipment;
Robust, threat oriented research and development;
Economic buy rates—try to get in, get out;
Maintain production base for essential consumables;
Quality U.S. equipment for foreign military sales;
Maintain warm base if funds available;
Reduce life cycle operations support costs.
Balanced total force with high—low mix.

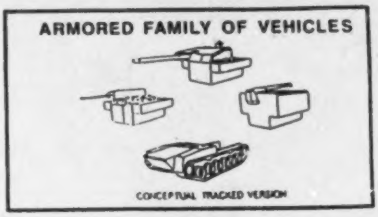
STRATEGY—TECHNOLOGY—FISCAL

I think it is important to understand the principles that have guided our work. Our equipment needs to flow from our doctrine which determines how we are going to fight. You must have a robust, threat-oriented research and development program. We try to take advantage of economic buy rates. Where possible, we get in at those buy rates and get out of it. One example of our doing that right now happens to be the Mobile Subscriber Equipment Program. We are going to outfit the entire Active Guard and Reserve within 5 years, buying in one fell swoop.

We need to maintain a production base for essential consumables, spare parts and the like. Our production base ought to be able to provide quality equipment which is attractive for foreign military sales. If we have the capability and the funds available, we will maintain a warm base. And obviously we get into reducing the life cycle operations support cost. All of these principles are considered while looking at the undergirding of strategy, technology and fiscal considerations.

THREAT DRIVES RESEARCH & DEVELOPMENT





IMPROVED ANTI-ARMOR PROTECTION
IMPROVED LETHALITY
ADVANCED FIRE CONTROL
INCREASED FIREPOWER
DISTINCT NUMERICAL ADVANTAGE

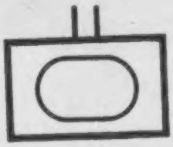
VS

GREATER LETHALITY
IMPROVED FIRE CONTROL
IMPROVED SURVIVABILITY
ADVANCED PROPULSION
ROBOTIC ENHANCEMENTS

In order to talk a little bit about this I am going to use a tank as an example and go through the programming process. Again, I am going to look ahead at what the Soviets would do in the tank game. In 1995 and beyond they will improve their armor protection and lethality by upgrading the missile or gun, fire control and the like. Obviously they have a numerical advantage because they produce 2,000 of those a year and we produce 800 a year. In order to counter that, I have got to look ahead in the research and development program to protect myself against their weaponry; to improve my survivability; to reduce the cost of ownership by maybe reducing the crew size or using robotic vehicles.

THE M1A1 ARMOR BATTALION IS MORE THAN 58 TANKS...

M1A1 ARMOR BATTALION



552 PERSONNEL

TANKS	ASSOCIATED EQUIPMENT	OPERATING COSTS	WAR RESERVES
$150M	$250M	$30M/YR	$30M

TOTAL $460M

WITH POMCUS $880M

I would also like to delve for just a moment into what an armor battalion is, because quite frequently we get tied up thinking only about the purchase of the tanks. Purchasing of the tanks is only one ingredient to field the battalion, which is the fighting unit.

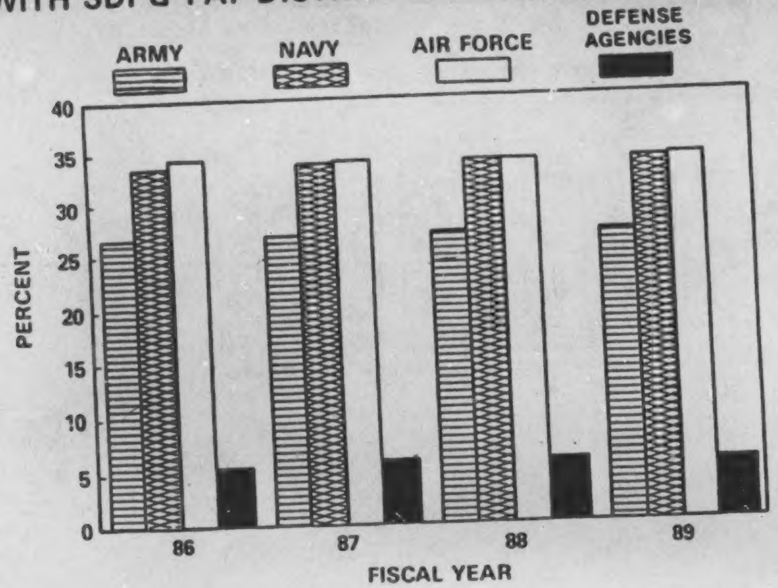
The 58 tanks are worth about $150 million. But the associated gear that goes with those tanks, in order to outfit a battalion, is another $250 million. The operating costs are $30 million a year, and the war reserves stocks are $30 million a year, in order to provide the ammunition for it. So while we think about $150 million for a battalion's worth of tanks, the actual investment cost is more like three times that amount.

FY88 – 89 ARMY BUDGET SUMMARY
(TOA IN $ BILLION)
[WITH SUPPLEMENTAL]

APPROPRIATION CATEGORIES	1987	1988	1989
MILITARY PERSONNEL	28.3	29.2	29.3
OPERATIONS AND MAINTENANCE	23.1	24.8	26.7
MILITARY CONSTRUCTION	3.3	3.4	3.6
[RESERVE COMPONENTS]	[8.0]	[8.5]	[8.9]
STOCK FUND (WAR RESERVES)	.1	.3	.4
SUBTOTAL	54.8	57.7	60.0
BALANCED BY:			
PROCUREMENT	15.9	16.2	16.6
RDT&E	4.8	5.5	6.0
TOTAL	75.5	79.4	82.6

Now we are concerned with the 1988-89 budget, so I would like to get right on to the procurement business. Here is the Army allocation of resources broken down into military personnel, including the Guard and Reserve; operations and maintenance, including Guard and Reserve; military construction, family housing and the like. What is available to balance the resource equation is the amount of money that is associated with both procurement and research and development, which turns out to be about $21.7 billion in 1988.

SERVICE SHARE OF THE BUDGET
(WITH SDI & PAY DISTRIBUTED TO THE SERVICES)

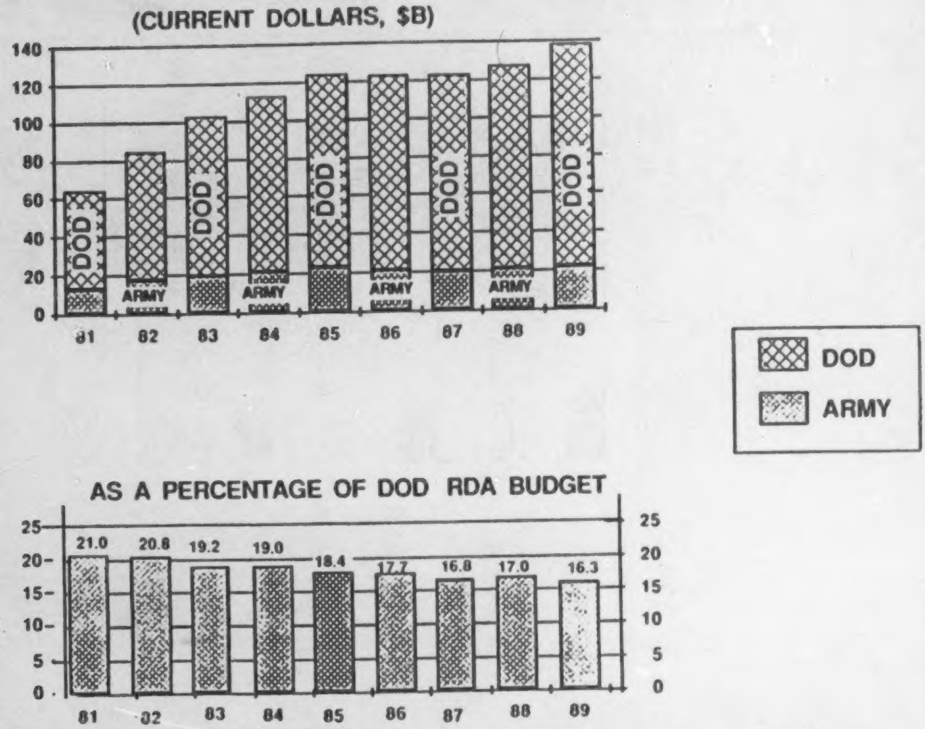


ARMY	26.5	26.5	26.7	26.8
NAVY	33.6	33.4	33.5	33.8
AIR FORCE	35.6	33.9	33.6	33.6
DEFENSE AGENCIES	4.3	6.2	6.2	6.1

This chart shows the OSD budget and the Army's portion of it. It has been about even across the years; in the aggregate the Army's share has been about 26 percent of the DOD budget.

INVESTMENT FUNDS IN ARMY vs DOD

R&D and PROCUREMENT FUNDING

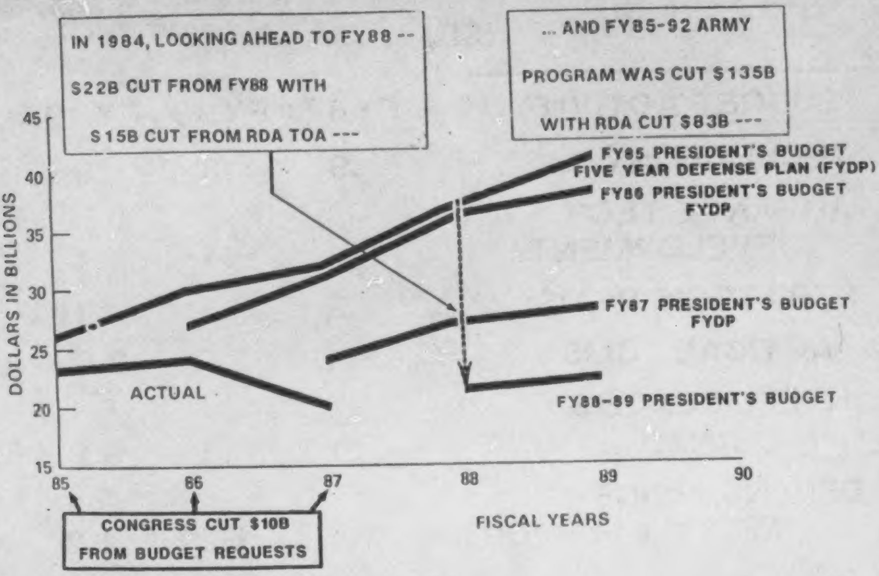


(CURRENT DOLLARS, $B)

AS A PERCENTAGE OF DOD RDA BUDGET

On the other hand, if you take a closer look at the investment dollars as a percentage of the DOD budget, you will see that in 1981 and 1982 the Army was operating at about a 20 to 21 percent share in terms of the percentage of the DOD investment budget. Now because of top line funding considerations, we are down here around 16 to 17 percent.

RDA TOTAL OBLIGATION AUTHORITY



Back in 1984 I stood back and looked ahead and asked, "where will I be in 1988?" The answer is, I would have thought the Army would have received another $22 billion in the overall top line of the budget, $15 billion of that would have been for the research, development and acquisition program.

If I were to have looked at the entire program for this 8-year period, it is $135 billion less with $83 billion of these cuts in research, development and acquisition. I hope that gives you some perspective of what has happened in the last 4 years.

ARMY'S FY88-89 RDTE SNAPSHOT ---

($B)

BUDGET ACTIVITY	FY87	FY88	FY89
TECHNOLOGY BASE	.9	.8	.9
ADVANCE TECH DEVELOPMENT	.4	.4	.4
STRATEGIC PGMS	.2	.1	.1
TACTICAL PGMS	2.1	2.9	3.3
INTELLIGENCE & COMMO	.1	.1	.1
DEFENSE WIDE MISSION SUPPORT	1.1	1.2	1.2
TOTAL	4.8	5.5	6.0

CONGRESS CUT $.8B FROM FY87 REQUEST

Now a word about R&D. I must maintain an adequate R&D program and this chart shows the funding of about $5.5 billion. The major part of it is in tactical programs which is where you would expect it to be. If we look inside those tactical programs, we find that the dollars are allocated to aircraft, air defense, armor, and so on.

THE HEART OF R&D --- TACTICAL PROGRAMS

($ MILLIONS)

TACTICAL PROGRAMS

FY87	FY88	FY89
2051	2882	3264

	FY87	FY88	FY89
AIRCRAFT	140	460	664
AIR DEFENSE	90	147	185
ARMOR	126	158	139
SPECIAL OPERATIONS FORCES	43	115	52
COMMO	159	228	263
MISSILES	209	276	302

THE FUTURE THRUSTS

ANTI-ARMOR WEAPONS	TACTICAL MISSILES	COMMAND &CONTROL
ARMORED FAMILY OF VEHICLES	JOINT STARS	ADVANCED MUNITIONS
FORWARD AREA AIR DEFENSE	JOINT TACTICAL FUSION	ADVANCED HELICOPTERS

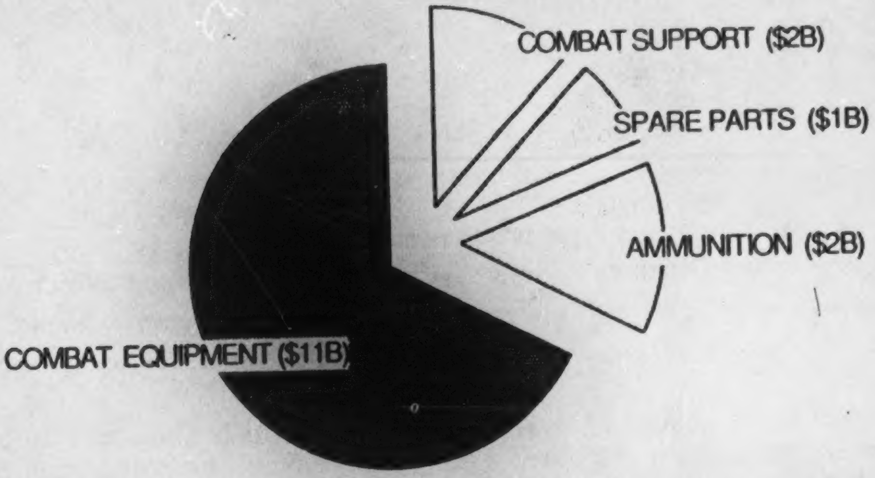
These are some tactical items in R&D which show our future thrust: anti-armor, Armored Family of Vehicles, Forward Area Air Defense, and the like.

AND NOW --- FOCUS ON PROCUREMENT FY88-89

	FY87	FY88	FY89
PROCUREMENT			
TOA ($B)	15.9	16.2	16.6
RDTE			
TOA ($B)	4.8	5.5	6.0
RDA (TOTAL)			
TOA ($B)	20.7	21.7	22.6

CONGRESS CUT $3.5B FROM REQUEST

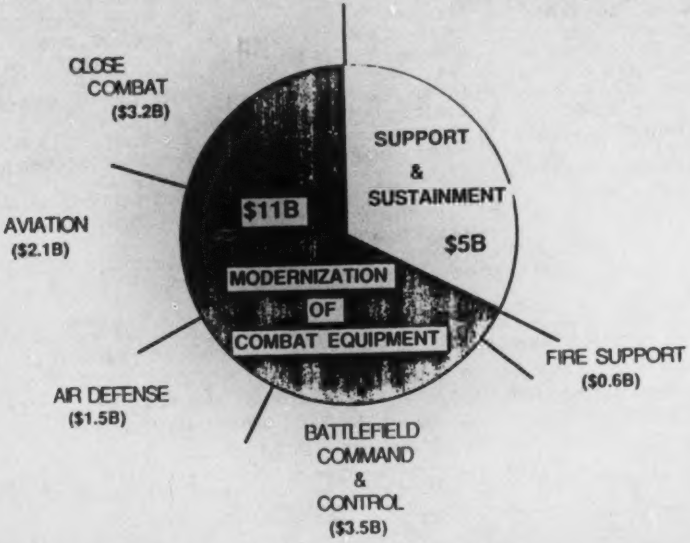
Now getting into the heart of the matter, which is the procurement appropriation, I earlier indicated to you that the total number for research, development and aquisition is about $21.7 billion and of that procurement appropriations amount to $16.2 billion, up only $300 million from the procurement line in the 1987 congressional budget.



FIXED PROCUREMENT COSTS

(FY 88 BUDGET--$16 Billion)

Looking at that $16 billion, the first deduction from it is what I call the routine support of the Army, which is trucks, generators and the like. That takes about $2 billion a year. Spare parts to keep the operation tempos going, about $1 billion, and the ammunition for both stockpiling as well as for training ammunition is about $2 billion a year.



PROCUREMENT AVAILABLE FOR MODERNIZATION

(FY88 BUDGET--$16 Billion)

So that says that there is about $11 billion in the budget to operate on the modernization program. If we take a look inside that $11 billion, we see that it is further allocated to accomplish close combat systems like tanks and fighting vehicles, about $3 billion, aviation about $2 billion, air defense about $1.5 billion, and battlefield communications and control about $3 billion, with fire support receiving the remainder.

MODERNIZATION STRATEGY

KEYED TO AIRLAND BATTLE

REAR

BLACKHAWK HELICOPTER*
CH-47 HELICOPTER*
PATRIOT*
RECOVERY VEHICLE
HIGH MOBILITY MULTI-PURPOSE WHEELED VEHICLE*
FAMILY OF MEDIUM TACTICAL VEHICLES*
HEAVY EXPANDED MOBILITY TACTICAL TRUCK

CLOSE

M1 TANK*
BRADLEY*
APACHE HELICOPTER*
HELLFIRE*
HOWITZER IMPROVEMENT
LIGHT HOWITZER
FORWARD AREA AIR DEFENSE*
TOW*
COMBAT EARTHMOVER
COPPERHEAD
NIGHT VISION*

DEEP

MULTIPLE LAUNCH ROCKET SYSTEM (MLRS)*
MLRS TERMINALLY GUIDED WARHEAD
ARMY TAC MSL SYS (ATACMS)
JOINT SURV & TGT ATK RADAR SYS (JOINT STARS)
AQUILA REMOTELY PILOTED VEHICLE*
JOINT TAC FUSION (ASAS)
SOF AIRCRAFT*

ARMY COMMAND/CONTROL SYSTEM (ACCS)

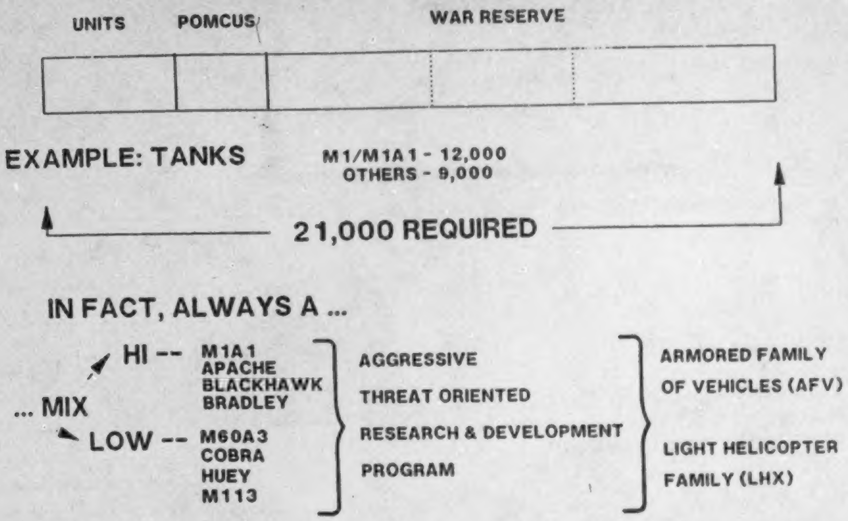
AFATDS FAAD C2I CSSCS MCS ASAS

- MANEUVER CONTROL SYS (MCS)*
- MOBILE SUBSCRIBER EQUIP (MSE)*
- FORWARD AREA AIR DEFENSE C2I
- ARMY DATA DISTRIBUTION SYS (ADDS)*
- SINGLE CHANNEL OBJ TAC TERMINAL (SCOTT)
- ADV FLD ARTILLERY TAC SYS (AFATDS)
- SING CHNL GRND/ABN RADIO SYS (SINCGARS)*
- JOINT TAC COMMO PRGM (TRI-TAC)*

*** 20 SYSTEMS = 70% FOR MODERNIZATION**

Now I am not going into all of these systems shown on the chart, but I would like to point out again that our procurement follows our doctrinal concept. We will prosecute the war as we see it in the rear, the close, and the deep battle area. These 20 systems that I have asterisked on the chart account for 70 percent of those $11 billion for procurement.

THE ARMY'S EQUIPMENT EQUATION



UNITS POMCUS WAR RESERVE

EXAMPLE: TANKS

M1/M1A1 - 12,000
OTHERS - 9,000

21,000 REQUIRED

IN FACT, ALWAYS A ...

... MIX

HI -- M1A1
APACHE
BLACKHAWK
BRADLEY

LOW -- M60A3
COBRA
HUEY
M113

AGGRESSIVE
THREAT ORIENTED
RESEARCH & DEVELOPMENT
PROGRAM

ARMORED FAMILY
OF VEHICLES (AFV)

LIGHT HELICOPTER
FAMILY (LHX)

Now reverting again to the tank program as a model for trying to understand the equipment programs in our budget, this chart shows the distribution of the items of equipment. For tanks, our units, prepositioned stocks and war reserves total about 21,000.

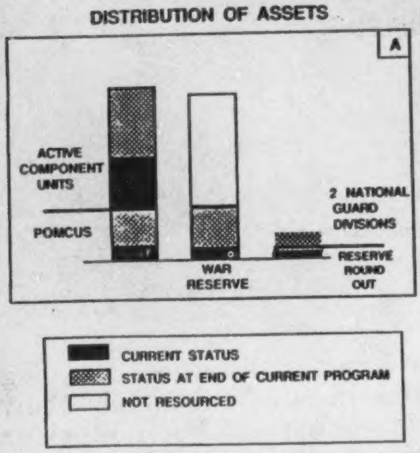
So we would say then that while I would like to have 21,000 tanks for an entire 180-day war period, the fact is that I will always have a high-low mix, brought about by technological improvement and the threat. So, in the high mix I have the M1A1 tank and the M1 tank and the Apache and the Black Hawk and the like. And on the low side of the mix I have the older M60A3 tanks the Cobras, the Hueys and the M113. So we look foward to the future and ask "What will I have to have in the year 1995 based upon what the Soviet projection is?"—The answer is I will have to begin R&D, which we have already done on the new Armored Family of Vehicles.

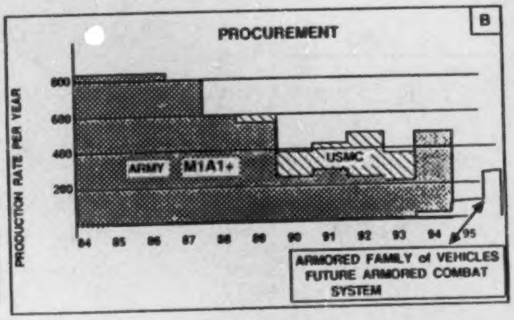
In order to replace the Cobra helicopter and the Huey, we have looked ahead in R&D and are developing something called the LHX.

Now let us step inside of the specific systems that you asked me to look at for this particular hearing, and try to describe to you the ebb and flow of the procurement program.

M1/M1A1, ABRAMS

FY 87 PROCUREMENT OBJECTIVE	7467*
CURRENT PROGRAM QUANTITY	8559*





* IF FULLY FUNDED AND MODERNIZED, TOTAL ARMY M1/M1A1 REQUIREMENT = 12,061

In 1987 I reported to you in the congressional documents that our M1 tank procurement objective was about 7,467. Now we are reporting to you in the current document that that number is more like 8,559, and it is operating on the profile of procurement that you see here. Notice that it stays up over 800 until 1988 and then begins to drop down in 1989. Then I add to it the Marine Corps buy, which is I believe is 560 tanks, and of course on top of that would be anything that might accrue to Foreign Military Sales, if we are able to make an agreement about that.

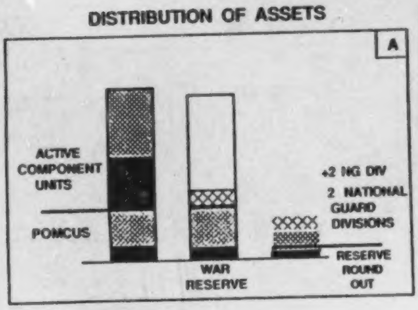
So what does this number of tanks then buy? It buys all of our Active component stocks, including prepositioned stocks overseas. Here is where the Chief of Staff indicated to you that we are one-third modernized as of the end of 1986.

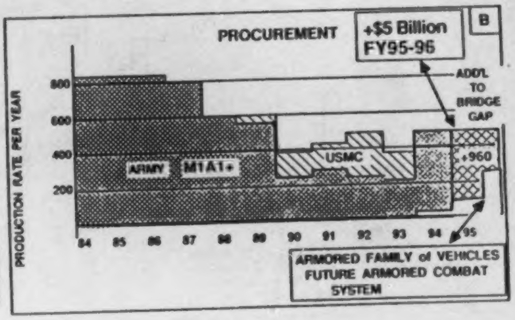
We also procure a portion of the war reserve stocks and equip two National Guard divisions and the Reserve roundout units. That is what this hatched area indicates.

As I look out in the 1994–1995–1996 timeframe, we begin to bring on the Armored Family of Vehicles to meet the threat that is emerging at that time. At that point we are looking at 8,500 tanks fully funded against an Army requirement of 12,000 modernized tanks. As we begin to bring on the new item of equipment, there is modest overlap between the old and the new in this particular scenario.

M1/M1A1, ABRAMS -- BRIDGING THE GAP

FY 87 PROCUREMENT OBJECTIVE	7467*
CURRENT PROGRAM QUANTITY	8559*
EXTENDED QUANTITY TO BRIDGE GAP	9519*





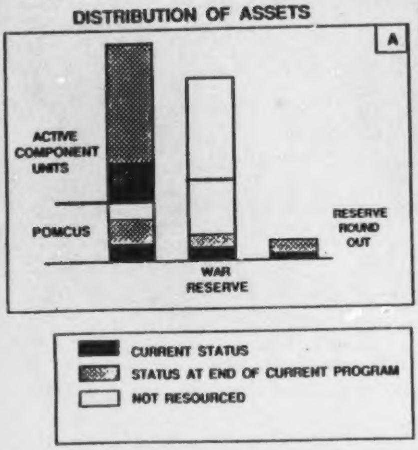
- ■ CURRENT STATUS
- ▨ STATUS AT END OF CURRENT PROGRAM
- ☐ NOT RESOURCED
- ▩ EFFECT OF GAP BRIDGING QUANTITY

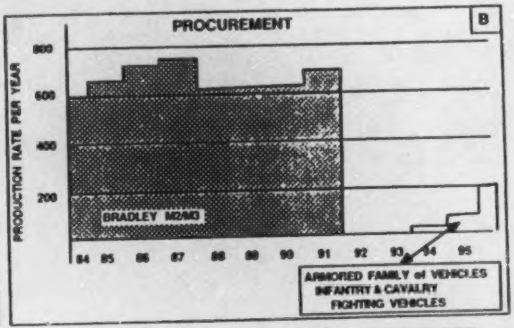
* IF FULLY FUNDED AND MODERNIZED, TOTAL ARMY M1/M1A1 REQUIREMENT = 12,061

Now the question is, what about bridging the gap if there is a delay in the follow-on system or you want to fully bridge the gap between the old and the new family of systems? We looked at that and concluded that 960 additional tanks are needed to bridge the gap to the new Armored Family of Vehicles. That would give you a new number, about 9,500. What would you get out of it? You would get two more National Guard divisions fully modernized and you would get some additional war reserve stock.

M2/M3, BRADLEY

FY 87 PROCUREMENT OBJECTIVE	6882*
CURRENT PROGRAM QUANTITY	6882*



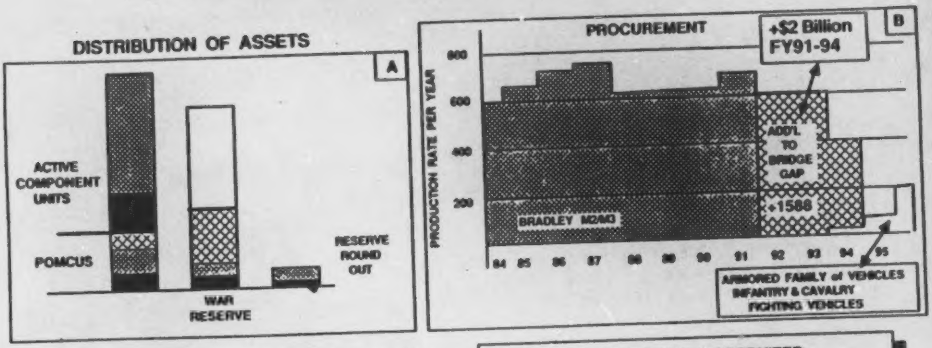


* IF FULLY FUNDED AND MODERNIZED, TOTAL ARMY BRADLEY REQUIREMENT = 11,519

With respect to the Bradley Fighting Vehicle, we reported to you in the Congress last year that we had an objective of 6,882. That is still the current projection. Procurement is scheduled to terminate at the end of 1991. What does 6,882 buy you? It would buy you Bradleys for the Active component. It does not buy all the required preposition stocks, and it does not buy you a full 30 days worth of war reserve stock. It would take care of only the Reserve roundout and it would not take care of the National Guard units that are equipped with the Abrams tank.

M2/M3, BRADLEY – BRIDGING THE GAP

FY 87 PROCUREMENT OBJECTIVE	6882*
CURRENT PROGRAM QUANTITY	6882*
EXTENDED QUANTITY TO BRIDGE GAP	8470*



* IF FULLY FUNDED AND MODERNIZED,
TOTAL ARMY BRADLEY REQUIREMENT = 11,519

■ CURRENT STATUS
▨ STATUS AT END OF CURRENT PROGRAM
☐ NOT RESOURCED
▩ EFFECT OF GAP BRIDGING QUANTITY

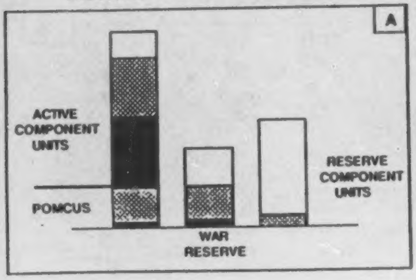
If you wanted to look at what the total requirement might be for Bradleys, it would be on the order of 11,500. But again the new system would come on in the 1993–1994 timeframe. You might say to me then, what does it take to bridge that gap? And the flip chart shows, in order to bridge that gap to assure that there would be no interruption in procurement would require another 1,588 vehicles.

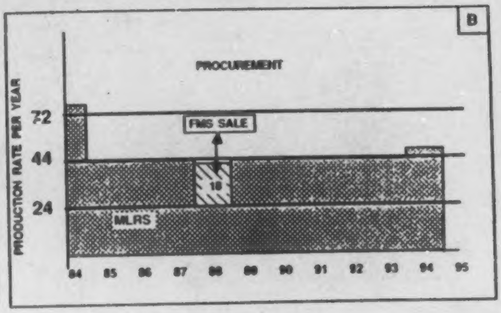
What would you get for those? The answer is that you would be able to roundout your war reserve stocks, but you would not be able to appreciably put in the program for the National Guard or Reserve units that would accompany the Abrams tank.

MLRS

FY 87 PROCUREMENT OBJECTIVE	491*
CURRENT PROGRAM QUANTITY	681*

DISTRIBUTION OF ASSETS





■ CURRENT STATUS
▨ STATUS AT END OF CURRENT PROGRAM
☐ NOT RESOURCED

* IF FULLY FUNDED AND MODERNIZED, TOTAL ARMY MLRS REQUIREMENT = 1381

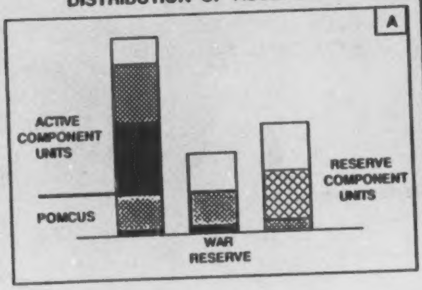
How about the Multiple Launch Rocket System? This is the procurement profile which shows 44 per year out to 1994. It buys us our Active component stocks and some war reserve. It does not fully equip the Reserve component. In the budget we submitted to you, we had to cut it down from an affordability point of view to 24 in 1988. There has been a Foreign Military Sales case that has brought that production rate back up, which helps us to smooth that flow out.

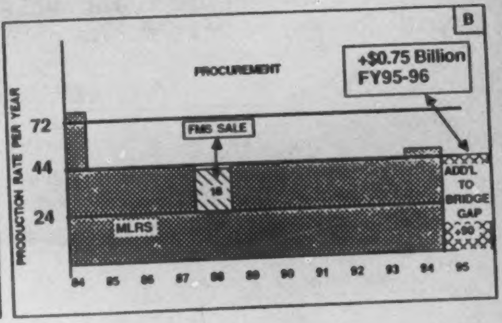
This will give us a current program quantity of about 681, and you would say, well it does not match your total requirement, and what about bridging into a follow-on system?

MLRS – BRIDGING THE GAP

FY 87 PROCUREMENT OBJECTIVE	491*
CURRENT PROGRAM QUANTITY	681*
EXTENDED QUANTITY TO BRIDGE GAP	771*

DISTRIBUTION OF ASSETS





- ■ CURRENT STATUS
- ▨ STATUS AT END OF CURRENT PROGRAM
- ☐ NOT RESOURCED
- ▩ EFFECT OF GAP BRIDGING QUANTITY

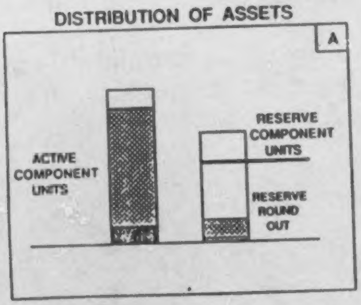
* IF FULLY FUNDED AND MODERNIZED, TOTAL ARMY MLRS REQUIREMENT = 1381

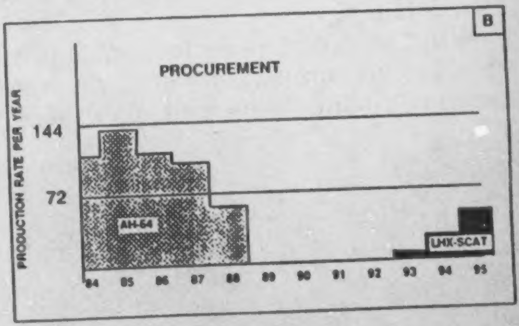
If you want to bridge this gap, it will be another 90 vehicles. This would begin to outfit each one of the Guard divisions with a battery of Multiple Launch Rocket Systems, which is a very efficient delivery of fire support.

AH-64, APACHE

FY 87 PROCUREMENT OBJECTIVE	675*
CURRENT PROGRAM QUANTITY	593*

DISTRIBUTION OF ASSETS





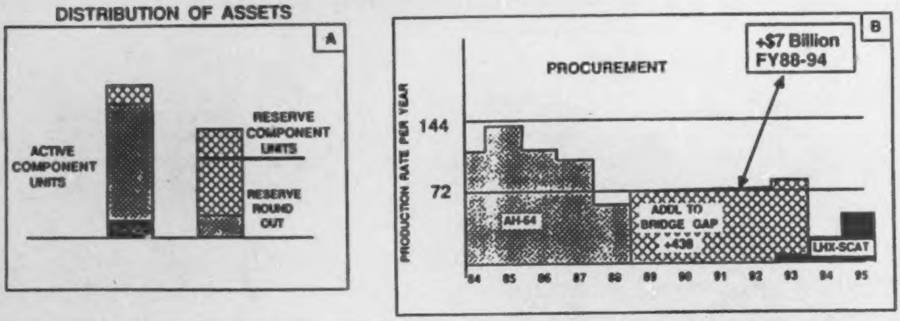
- ■ CURRENT STATUS
- ▨ STATUS AT END OF CURRENT PROGRAM
- ☐ NOT RESOURCED

* IF FULLY FUNDED AND MODERNIZED, TOTAL ARMY APACHE REQUIREMENT = 1031 (FORMERLY 1206, SHORT 9 BATTALIONS [COMPO 4] AND ASSOCIATED FLOAT & TRAINING = -175)

How about the Apache helicopter? In 1987, we reported to you that 675 was the procurement objective. Based upon affordability considerations in this current program, we now have revised it downward slightly to 593, with production terminating at the end of 1988. What does that program outfit? The answer is, it takes care of the Active component, and it takes care of some portion of the Reserve and Guard roundout. As you know, we do not buy any aircraft for war reserve stocks.

AH-64, APACHE -- BRIDGING THE GAP

FY 87 PROCUREMENT OBJECTIVE	675*
CURRENT PROGRAM QUANTITY	593*
EXTENDED QUANTITY TO BRIDGE GAP	1031*



- ■ CURRENT STATUS
- ▒ STATUS AT END OF CURRENT PROGRAM
- ☐ NOT RESOURCED
- ▩ EFFECT OF GAP BRIDGING QUANTITY

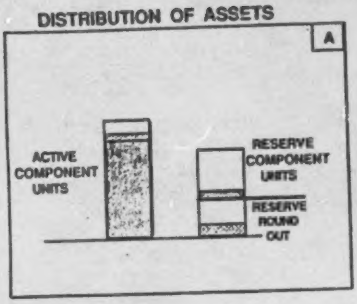
* IF FULLY FUNDED AND MODERNIZED, TOTAL ARMY APACHE REQUIREMENT = 1031 (FORMERLY 1206, SHORT 9 BATTALIONS [COMPO 4] AND ASSOCIATED FLOAT & TRAINING = -175)

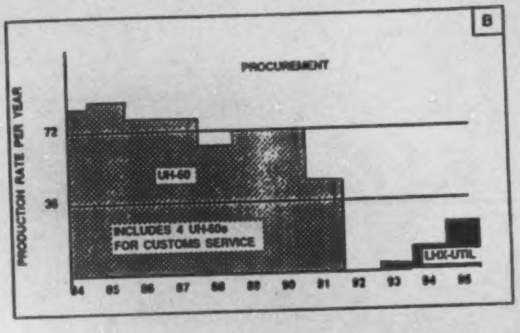
How do we bridge that gap all the way over to the right, and get more toward the Army Apache requirement of 1,031? It would require another 400 aircraft at a total cost of about $7 billion before the LHX begins to come on-line to replace the AH-1 Cobra and the UH-1 Huey.

What would that do for us? It would allow us to completely equip the Active component, and we would begin to modernize the Reserve components as well. So that is the Apache story.

UH-60, BLACKHAWK

FY 87 PROCUREMENT OBJECTIVE	1107*
CURRENT PROGRAM QUANTITY	1107*





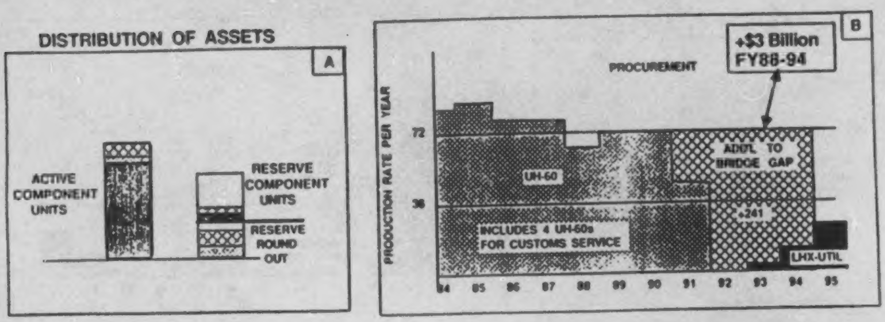
▮ CURRENT STATUS
▨ STATUS AT END OF CURRENT PROGRAM
☐ NOT RESOURCED

* IF FULLY FUNDED AND MODERNIZED, TOTAL ARMY BLACKHAWK REQUIREMENT = 1775 (FORMERLY 3115, SHORT COMPO 4 & MISSIONS PLANNED TO BE COVERED BY LHX & JVX AND ASSOCIATED FLOATS = - 1340)

Now in the case of the UH-60 Black Hawk, again we reported to you last year 1,107, this year we report the same. It shuts down at the end of 1991, still not into the production of the LHX. This will outfit most of our Active component, some of our Reserve roundout, and some of the Reserve component units. It does not meet the total requirement of 1,775 aircraft.

UH-60, BLACKHAWK — BRIDGING THE GAP

FY 87 PROCUREMENT OBJECTIVE	1107*
CURRENT PROGRAM QUANTITY	1107*
EXTENDED QUANTITY TO BRIDGE GAP	1348*



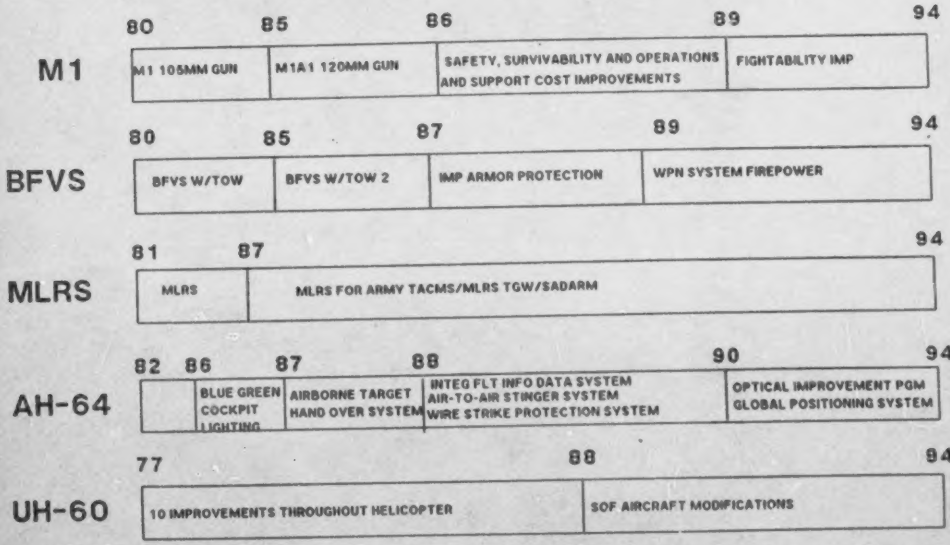
- ■ CURRENT STATUS
- ▨ STATUS AT END OF CURRENT PROGRAM
- ☐ NOT RESOURCED
- ▩ EFFECT OF GAP BRIDGING QUANTITY

* IF FULLY FUNDED AND MODERNIZED, TOTAL ARMY BLACKHAWK REQUIREMENT = 1775 (FORMERLY 3115, SHORT COMPO 4 & MISSIONS PLANNED TO BE COVERED BY LHX & JVX AND ASSOCIATED FLOATS = - 1340)

To bridge the Black Hawk gap would require another 241 aircraft. The cost would be $3 billion and would take care of the Active component and some more of our Reserve.

WEAPON SYSTEMS MODIFICATIONS

--- THREAT, SAFETY, SUPPORT COST REDUCTION DRIVEN


M1
80
85
86
89
94
M1 105MM GUN
M1A1 120MM GUN
SAFETY, SURVIVABILITY AND OPERATIONS AND SUPPORT COST IMPROVEMENTS
FIGHTABILITY IMP
BFVS
80
85
87
89
94
BFVS W/TOW
BFVS W/TOW 2
IMP ARMOR PROTECTION
WPN SYSTEM FIREPOWER
MLRS
81
87
94
MLRS
MLRS FOR ARMY TACMS/MLRS TGW/SADARM
AH-64
82
86
87
88
90
94
BLUE GREEN COCKPIT LIGHTING
AIRBORNE TARGET HAND OVER SYSTEM
INTEG FLT INFO DATA SYSTEM
AIR-TO-AIR STINGER SYSTEM
WIRE STRIKE PROTECTION SYSTEM
OPTICAL IMPROVEMENT PGM
GLOBAL POSITIONING SYSTEM
UH-60
77
88
94
10 IMPROVEMENTS THROUGHOUT HELICOPTER
SOF AIRCRAFT MODIFICATIONS

(YEAR = CUT IN ... OF MODIFICATION)

You asked me to describe whether we have a robust modification program. The answer is we do, and on these five systems I will just highlight some of the major modifications. On the M1A1, we have already gone from a 105mm gun on the M1 tank to a 120mm gun. That was a major improvement, and we will continue to modify and improve the tank's safety and survivability as we bring on the commander's independent thermal viewer, for example, in 1990.

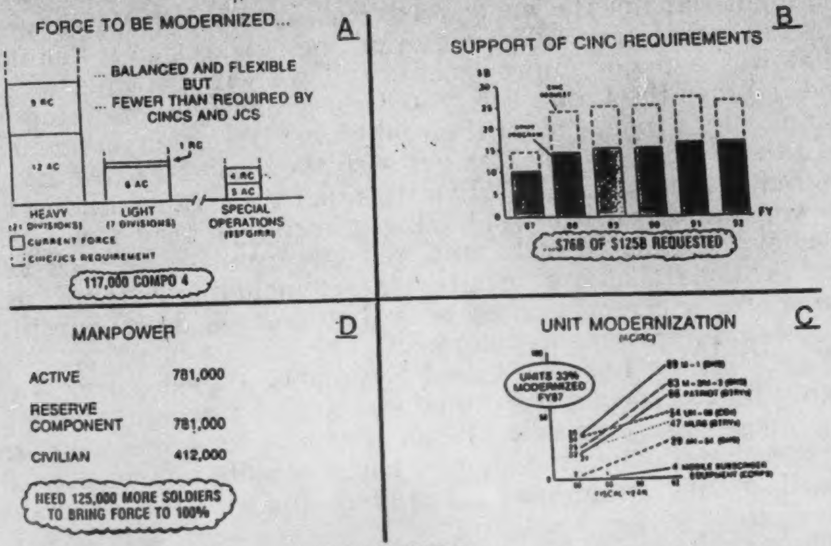
In the Bradley, we started out with the basic TOW, we have now upgraded to the TOW 2, which has increased range and lethality. As you know, we are conducting a series of tests now with the Bradley Fighting Vehicle, and will cut in whatever survivability modifications that are required there, including perhaps reactive armor. We will report on those to the Congress. There are firepower system improvements later on.

The Multiple Launch Rocket System is a good story. We have been able to economize in force structure by bringing on a whole new longer range missile system that still uses the same ground support system that the shorter range missile system does. These modifications have already taken place and will start in production this year.

The Apache has had several modifications. Blue-green cockpit for night vision lighting, airborne target handoff system this year, more air-to-air Stinger next year, and the like, including further improvements on optical and global positioning in 1990.

Finally, the UH-60 model has had over 100 engineering changes, 10 of which are major improvements in the helicopter, and of course in 1988 we begin to work on the UH-60A's which has an extensive sweep of avionics modifications to support Special Operations Forces.

BALANCE ACROSS THE ARMY

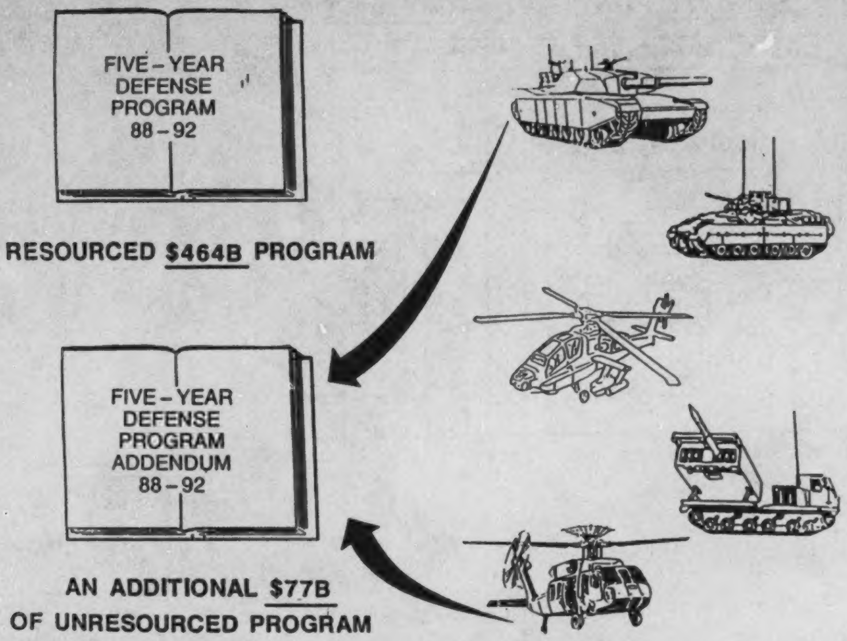


ACTIVE	781,000
RESERVE COMPONENT	781,000
CIVILIAN	412,000

READINESS,
SUSTAINABILITY, MODERNIZATION, FORCE STRUCTURE

I have given you a portrait of production, but I must also remind you that production must be viewed always in the context of affordability and the allocation of shortages. For example, I pointed out to you earlier that the force to be modernized is less than that required by both the CINC's and JCS. Supporting the CINC requirements, based upon what they would like to have, we are short about $50 billion. We did resource $76 billion of it in our program. In order to take my current force and bring it up to 100-percent strength, it would take me 125,000 more soldiers. I just indicated to you, and Gen. Bernard Rogers, as you know, has commented that he would like to have as many as 30,000 more soldiers to outfit all of his units to 100 percent.

This chart is an extract from the Chief of Staff's briefing that you alluded to, Mr. Chairman, and it shows that one-third of all the units will be modernized by the end of 1987.

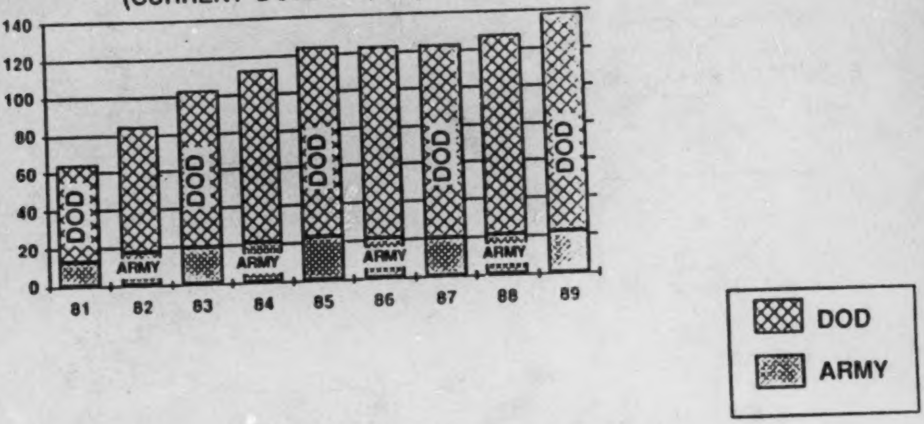

FIVE-YEAR
DEFENSE
PROGRAM
88-92
RESOURCED $464B PROGRAM
FIVE-YEAR
DEFENSE
PROGRAM
ADDENDUM
88-92
AN ADDITIONAL $77B
OF UNRESOURCED PROGRAM

Well, how does all this play out in the resource equation as we do battle both inside the building and here in the Congress? The answer is that our Five-Year Defense Program has been resourced to that value. When I turn this program in, I also turned in a program addendum that stated, by the way, there is another $77 billion that can be produced by American industry, if you have the opportunity to do that. There is ample opportunity for increased resources and modernization in all those basic systems that we described, but in the end, it is an affordability drill.

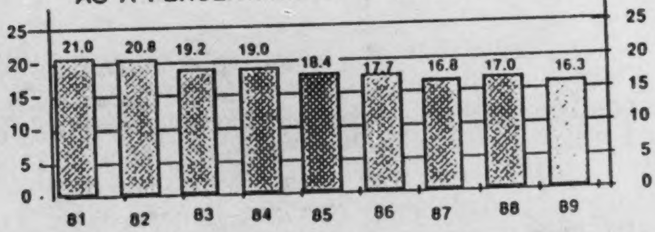
INVESTMENT FUNDS IN ARMY vs DOD

R&D and PROCUREMENT FUNDING

(CURRENT DOLLARS, $B)



AS A PERCENTAGE OF DOD RDA BUDGET



I tried to explain that over time we have had about 20 to 21 percent of the OSD budget for research, development and acquisition. Currently we sit in a position of having about 17 percent. That presents the dilemmas that we have had in bridging gaps and maintaining an adequate base for modernization.

Now with that as a backdrop, we will be happy to answer any questions that the committee may have.

[The prepared statement of General Thurman follows:]

PREPARED STATEMENT OF GEN. MAXWELL R. THURMAN
Vice Chief of Staff, U.S. Army

MR. CHAIRMAN, WE RECOGNIZE AND APPRECIATE THE INTEREST OF THE CONGRESS IN THE MANNER IN WHICH WE HAVE BEEN MODERNIZING AND ACQUIRING SYSTEMS TO ENSURE THAT OUR ARMY IS PREPARED TO PERFORM ITS STRATEGIC MISSIONS IN WAR AND PEACE. YOUR SPECIFIC REQUEST WAS FOR THE ARMY TO ADDRESS THE REQUIREMENT TO RETAIN AN ACTIVE PRODUCTION BASE, TO EVALUATE PROCUREMENT OBJECTIVES, AND TO TRANSITION FROM THE CURRENT TO THE FOLLOW-ON SYSTEMS.

THE ARMY'S ACQUISITION STRATEGY IS BASED ON A SET OF PRINCIPLES:

FIRST, THE ARMY PURCHASES DOCTRINALLY-BASED EQUIPMENT; EQUIPMENT DESIGNED AND CONFIGURED TO FULFILL ARMY REQUIREMENTS AS THEY ARE DETERMINED THROUGH EXHAUSTIVE ANALYSIS OF THE THREAT AND THE ADEQUATE RESPONSE TO IT.

SECOND, AT THE SAME TIME THAT WE ARE PROCURING SYSTEMS, WE MUST MAINTAIN A ROBUST, THREAT-ORIENTED RESEARCH AND DEVELOPMENT PROGRAM TO PROVIDE THE MODERN, LETHAL BATTLEFIELD SYSTEMS OF THE NEXT DECADE.

WE PURSUE ECONOMIC BUY RATES BY TRYING TO GET-IN AND GET-OUT OF SYSTEMS PROCUREMENT. WE RECOGNIZE THAT WE CANNOT BUY SYSTEMS FOREVER. ECONOMICS AND OBSOLESCENCE ARGUE AGAINST STRETCHED OUT PROCUREMENTS. OUR RECENT PURCHASE OF FIVE CORPS SETS OF MOBILE SUBSCRIBER EQUIPMENT IN FIVE YEARS FOR THE TOTAL ARMY IS AN EXAMPLE OF AN ARMY-INDUSTRY GET-IN, GET-OUT SUCCESS STORY.

OF COURSE, THERE ARE SOME ITEMS THAT DEMAND CONSTANCY IN THE PRODUCTION BASE. AMMUNITION AND SPARES REQUIRE THE MAINTENANCE OF A WARM BASE FOR CONSUMABLE SUPPLIES.

IN A PARTNERSHIP PROMOTING A WARM INDUSTRIAL BASE FOR SYSTEMS, THE ARMY AND INDUSTRY MUST DEMONSTRATE THAT QUALITY AMERICAN EQUIPMENT IS THE RIGHT

EQUIPMENT FOR OUR ALLIES THROUGH FOREIGN MILITARY SALES. THIS CAN PROVIDE INDUSTRIAL PRODUCTION EFFICIENCY DESPITE CONSTRAINED DEFENSE BUDGETS.

THE ARMY'S INTENT IS TO MAINTAIN A WARM PRODUCTION BASE WHEREVER IT IS REQUIRED, PRACTICAL, AND AFFORDABLE. AS MENTIONED, CONSUMABLES DEMAND A WARM BASE. THE TEST OF PRACTICALITY AND AFFORDABILITY FORCES SYSTEMS OUT OF PRODUCTION.

THE ARMY HAS RECEIVED SUBSTANTIALLY INCREASED FISCAL RESOURCE LEVELS SINCE 1981. WE HAD TO MAKE SOME HARD STRATEGIC CHOICES EARLY ON SO THAT WE COULD SHAPE OUR ARMY TO ACCOMPLISH ITS EXPANDED WORLD-WIDE MISSIONS AND EQUIP IT PROPERLY. FIRST, WE FIXED OUR ACTIVE MILITARY END STRENGTH AND FOCUSED ON RECRUITING AND RETAINING QUALITY SOLDIERS TO BUILD COMPETENT, COMMITTED, COURAGEOUS, AND LOYAL UNITS. SOLDIERS ARE OUR MOST VALUABLE RESOURCE. WE HAD PLANNED TO GROW SUBSTANTIALLY IN STRENGTH, BUT WE CUT BACK TO FREE UP DOLLARS NEEDED FOR MODERNIZATION. WE REDESIGNED THE FORCE STRUCTURE TO CREATE VERSATILITY, BALANCE, AND FLEXIBILITY. WE HAVE SYSTEMATICALLY DEVELOPED FIVE-YEAR PROGRAMS TO ACCOMPLISH THESE GOALS BUT IN THE FACE OF BUDGET DEFICITS AND CONGRESSIONAL ACTIONS WE HAVE RECENTLY HAD TO MAKE OTHER TOUGH DECISIONS WHICH SUBSTANTIALLY REDUCED MANY OF OUR PROGRAMS. IN FACT, OVER THE PERIOD FY85-FY92, OUR PROGRAM HAS BEEN REDUCED BY $135 BILLION.

WITHIN OUR FIVE YEAR PROGRAM, YOU MIGHT REFER TO THE OPERATIONS ACCOUNTS AS FIXED COSTS. SIMPLY PUT, THE COST OF MAINTAINING OUR CURRENT FORCE AND OPERATING INCREASING INVENTORIES OF EQUIPMENT FOR THAT FORCE INCREASES OPERATIONS AND MAINTENANCE REQUIREMENTS. ARMY PROGRAM REDUCTIONS, THEREFORE, ARE FOCUSED ON THE INVESTMENT ACCOUNTS WHICH HAVE ABSORBED 70% OF THE LOSS. THIS LOSS OF DOLLARS ALSO EXPLAINS WHY WE ARE NOT ABLE TO PROCURE, OFTEN TIMES, AT THE MOST EFFICIENT AND ECONOMICAL RATE OF PRODUCTION. MOREOVER, THE ARMY MUST MAINTAIN AN AGGRESSIVE RESEARCH AND DEVELOPMENT PROGRAM TO PRODUCE TIMELY FOLLOW-ON SYSTEMS, TO TAKE ADVANTAGE OF EVER CHANGING NEW TECHNOLOGIES TO MEET TOMORROW'S THREAT.

OF OUR $80 BILLION FY88 BUDGET, $20 TO $22 BILLION IS AVAILABLE TO THE R&D AND PROCUREMENT ACCOUNTS. THIS $20 TO $22 BILLION WITHIN THE ARMY'S INVESTMENT ACCOUNTS HAS REMAINED RELATIVELY CONSTANT SINCE 1983, WHILE THE TOTAL DEPARTMENT OF DEFENSE INVESTMENT FUNDS HAVE SHOWN AN INCREASE. THUS, THE ARMY'S PORTION OF THE TOTAL DEFENSE INVESTMENT ACCOUNTS HAS SHOWN A STEADY DECLINE, FROM A HIGH OF 21% IN FY81 TO LOW OF LESS THAN 17% IN FY89. IN ORDER TO KEEP A REASONABLE INVESTMENT IN THE FUTURE EQUIPMENT NEEDS, THE ARMY ALLOCATES ABOUT FIVE BILLION DOLLARS ANNUALLY TO THE RDTE ACCOUNT. THIS IS THE MINIMUM AMOUNT NEEDED TO PROTECT THE FUTURE EQUIPMENT NEEDS OF THE ARMY. OUR R&D BUDGET IS FOCUSED ON TACTICAL PROGRAMS.

THE REMAINING $16 BILLION IS IN THE PROCUREMENT ACCOUNTS. BUT NOT ALL OF THIS FUNDING IS AVAILABLE FOR MODERNIZATION PURPOSES. THESE ARE RECURRING COSTS WHICH MUST BE PAID OUT OF THE TOTAL PROCUREMENT ACCOUNT. THE ARMY SPENDS ABOUT TWO BILLION DOLLARS ANNUALLY FOR AMMUNITION, ABOUT ONE BILLION DOLLARS FOR REPLENISHMENT SPARES, AND ABOUT TWO BILLION DOLLARS FOR REPLACEMENT EQUIPMENT WORN OUT THROUGH NORMAL SERVICE. THIS LEAVES ONLY ELEVEN BILLION DOLLARS, OUT OF AN $80 BILLION BUDGET TO MODERNIZE THE TOTAL ARMY. THIS ELEVEN BILLION DOLLARS IS ALLOCATED AMONG FIVE MAJOR AREAS FOR MODERNIZATION: CLOSE COMBAT, FIRE SUPPORT, AIR DEFENSE, AVIATION, AND BATTLEFIELD COMMAND AND CONTROL.

LET ME REVIEW OUR PROCUREMENT PLANS FOR THE M1 (ABRAMS), M2/3 (BRADLEY), MULTIPLE LAUNCH ROCKET SYSTEM (MLRS); UH-60 (BLACKHAWK); AND AH-64 (APACHE) AND ADDRESS CONCERNS ON MAINTAINING A WARM PRODUCTION BASE.

THE ARMY CURRENTLY PROJECTS THE M1 TANK LINE TO CONTINUE THROUGH THE FY94 FUNDED DELIVERY PERIOD. THIS RESULTS IN THE PROCUREMENT OF A TOTAL OF 8559 TANKS FOR THE ARMY AND 560 TANKS FOR U.S. MARINE CORPS' REQUIREMENTS. THIS CURRENTLY PLANNED PROGRAM QUANTITY PROVIDES M1'S FOR ALL ACTIVE AND RESERVE COMPONENTS, ROUND-OUT UNITS, POMCUS, AND SOME WAR RESERVE REQUIRE-

MENTS. IN ADDITION, AT THE END OF THE CURRENT PRODUCTION RUN, THE M1 FAMILY OF TANKS WILL BE FIELDED IN THE NATIONAL GUARD MECHANIZED DIVISIONS. WITH THE FY94 FUNDED DELIVERY PERIOD EXTENDING INTO FY96, AND THE CURRENTLY PROJECTED AVAILABILITY OF THE M1 FOLLOW-ON IN FY95, SUFFICIENT OVERLAP SHOULD EXIST TO MAINTAIN A WARM PRODUCTION BASE AND SMOOTH TRANSITION TO THE NEW SYSTEM. IF THE PROJECTED FOLLOW-ON SYSTEM FAILS TO MEET ITS PLANNED AVAILABILITY DATES, EXTENSION OF THE TANK LINE CAN BE ACCOMPLISHED WITH ADDITIONAL FUNDING. ADDITIONAL PRODUCTION WOULD PUT M1'S IN THE TWO NATIONAL GUARD ARMORED DIVISIONS AND DEEP WAR RESERVE. HOWEVER, SUCH PRODUCTION AT A COST OF $5 BILLION IS NOT CURRENTLY PROGRAMMED IN LIGHT OF OTHER IMPORTANT MODERNIZATION NEEDS THAT EXIST WITHIN THE OTHER MISSION AREAS AND TOP LINE FUNDING CONSTRAINTS.

THE ARMY'S PLAN FOR M2/M3 BRADLEY COMPLETES THE CURRENT PRODUCTION RUN IN FY91 AT THE PROCUREMENT OBJECTIVE OF 6882 VEHICLES. THIS QUANTITY FIELDS THE BRADLEY TO ALL ACTIVE AND RESERVE COMPONENT ROUND-OUT UNITS AND IT PROVIDES A PORTION OF THE POMCUS REQUIREMENT AND SOME WAR RESERVE STOCKS. EXTENSION OF THE PROCUREMENT OBJECTIVE TO 8470 BRADLEYS WOULD RESULT IN THE FILLING OUT OF THE POMCUS SETS AND WAR RESERVE NEEDS. THIS WOULD STRETCH THE PRODUCTION RUN TO FY94 AND OVERLAP THE CURRENTLY ESTIMATED AVAILABILITY OF THE FOLLOW-ON SYSTEM IN FY95, BUT IS NOT PROGRAMMED UNDER CURRENT RESOURCE LIMITATIONS.

MLRS IS CURRENTLY PLANNED FOR A PROCUREMENT QUANTITY OF 681 LAUNCHERS OUT OF A FULLY MODERNIZED REQUIREMENT OF 1381 AND RESULTS IN FIELDING THE MAJORITY OF THE ACTIVE ARMY'S NEEDS AND IN THE RESOURCING OF POMCUS FOR THE DEPLOYING FORCES. THE CURRENT MLRS PROGRAM WILL COMPLETE THIS PLANNED PRODUCTION IN FY94, AND IT SHOULD BE NOTED THAT, PRESENTLY, NO SPECIFIC REPLACEMENT FOR THE MLRS SYSTEM HAS BEEN IDENTIFIED. SHOULD THE DECISION BE MADE TO CONTINUE PRODUCTION OF THE MLRS BEYOND THE CURRENT PROCUREMENT OJECTIVES, EXTENDING THE PRODUCTION TO FY96 WOULD PROVIDE A TOTAL OF 771

LAUNCHERS. THESE ADDITIONAL 90 ITEMS OF EQUIPMENT WOULD RESULT IN EQUIPPING THE NINE NATIONAL GUARD DIVISIONS WITH MLRS BATTERIES.

THE ARMY GOAL FOR PROCUREMENT OF AH-64 (APACHE) ATTACK HELICOPTERS WAS ESTABLISHED IN 1984 AT 675 AIRCRAFT. OF THIS TOTAL, THE CURRENT PROGRAM WILL PURCHASE ONLY 593 AIRCRAFT BY THE END OF THE PLANNED PROCUREMENT IN FY88. DELIVERIES OF THIS SYSTEM WILL EXTEND INTO FY90 WITH THE LHX, WHICH REPLACES THE COBRA AIRCRAFT, COMING ON LINE AS THE LIGHT ATTACK AIRCRAFT IN FY95. THE ARMY'S TOTAL REQUIREMENT FOR HEAVY ATTACK HELICOPTERS IS 1206 AIRCRAFT INCLUDING 175 IN THE COMPO 4 (THE UNMANNED, UNEQUIPPED STRUCTURE OF THE ARMY). WE DO NOT INTEND TO BUY EQUIPMENT FOR UNMANNED UNITS. THE CURRENT PROGRAM FIELDS THE APACHE IN THOSE UNITS AND AREAS DEEMED TO BE THE MOST CRITICAL, LIKE EUROPE AND ITS REINFORCING ELEMENTS. EXTENSION OF THE PRODUCTION LINE TO PROVIDE FOR AN INCREASED QUANTITY OF EQUIPMENT IS POSSIBLE, HOWEVER, THE ARMY DOES NOT HAVE THE RESOURCES TO DO SO. IT WOULD REQUIRE AN ADDITIONAL $7 BILLION TO RAISE THE PROCUREMENT OBJECTIVE FROM 675 TO 1031 AIRCRAFT, THE NUMBER WE NEED FOR ALL ACTIVE AND RESERVE COMPONENT UNITS. THIS WOULD EXTEND PRODUCTION OF THE AH-64 INTO FY96.

THE ARMY CURRENTLY PLANS TO BUY 1107 UH-60 (BLACKHAWK) HELICOPTERS. THIS PROCUREMENT OBJECTIVE WILL BE REACHED AT THE END OF THE CURRENT PRODUCTION RUN IN FY91. THE TOTAL BLACKHAWK REQUIREMENT IS 1775 AIRCRAFT, FOR ALL STRUCTURE NEEDS NOT PROVIDED BY JVX AND LHX. TO KEEP THE LINE OPEN UNTIL FY95 TO OVERLAP PRODUCTION OF LHX BY TWO YEARS WOULD REQUIRE $3 BILLION NOT CURRENTLY PROGRAMMED.

THE ARMY DOES NOT HAVE THE ADDITIONAL $18 BILLION TO KEEP THESE FIVE LINES RUNNING UNTIL FOLLOW-ON SYSTEMS ARE FIELDED. THE ARMY MUST PROVIDE A BALANCED MODERNIZATION PROGRAM - COMBAT SYSTEMS, COMBAT SUPPORT/COMBAT SERVICE SUPPORT, AIR DEFENSE, FIRE SUPPORT, AND COMMAND & CONTROL SYSTEMS. IN ADDITION, WE MUST BALANCE ALL OTHER CLAIMANTS -

ACTIVE AND RESERVE STRENGTH, FAMILY SUPPORT, OPERATING TEMPO, FACILITIES AND MAINTENANCE - IN HARMONY TO MEET JCS & CINC MINIMUM REQUIREMENTS. IN THE CURRENT RESOURCE CONSTRAINED ENVIRONMENT, WE HAVE PROVIDED OUR BEST JUDGEMENT TO YOU AS TO THAT BALANCE.

FOR MANY YEARS THE ARMY'S FIVE YEAR PROGRAM HAS BEEN SUBMITTED TO THE OFFICE OF THE SECRETARY OF DEFENSE WITH AN ADDENDUM WHICH LISTS THOSE THINGS WE NEED TO DO, BUT HAVE SIMPLY NOT BEEN RESOURCED TO DO. FOR EXAMPLE, THE PRESENT PROGRAM ADDENDUM IS ESTIMATED AT $77 BILLION AND CONTAINS SOME OF THE VERY SYSTEMS I HAVE DISCUSSED. THE LONG TERM AFFORDABILITY ANALYSES INDICATE THAT THE ARMY REQUIRES REAL GROWTH FOR THE INVESTMENT ACCOUNTS IF THE ARMY IS TO MODERNIZE QUICKLY.

IN SUM, AVAILABLE FUNDS ARE PRESENTLY BALANCED AMONG MISSION AREAS. AS OUTLINED IN OUR ACQUISITION PRINCIPLES, THE ARMY'S INTENT AND PLAN IS TO PURCHASE AS FULL AND BALANCED A SUITE OF COMBAT SYSTEMS AS POSSIBLE. THE ARMY'S PLANNED PROCUREMENT FOR MAJOR WEAPON SYSTEMS IS THE MINIMUM QUANTITY NEEDED TO KEEP THE TOTAL FORCE READY IN AN ENVIRONMENT OF FISCAL CONSTRAINTS.

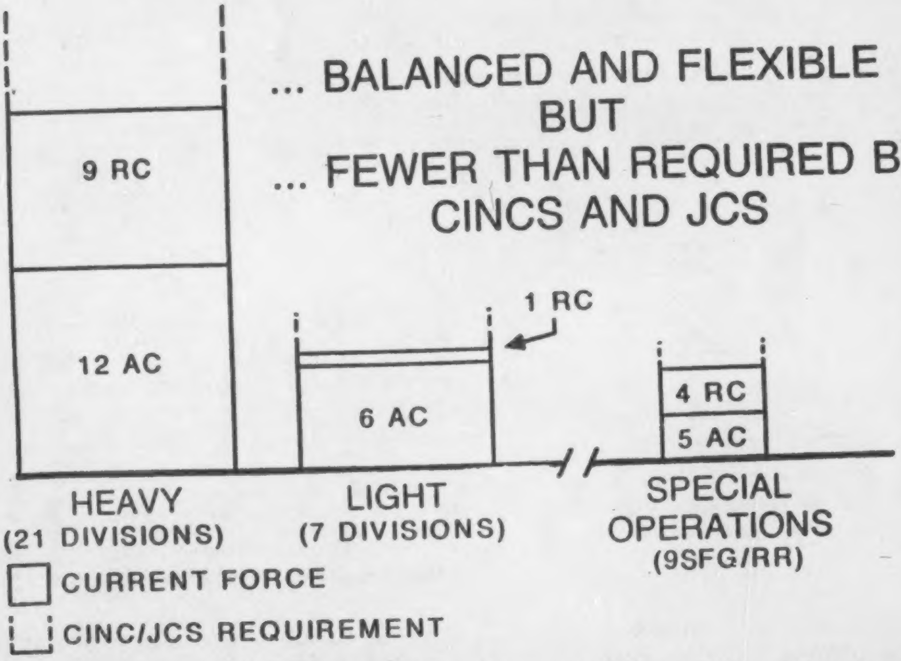
Senator LEVIN. Thank you, General. We will follow the so-called "early bird" rule, as we do on the full committee. We will start with a 10-minute round of questions this morning.

General, as I mentioned in my opening statement, I am deeply concerned that we are not going to be modernizing to our requirement, and that we are going to be prematurely terminating the production of systems which are apparently working well.

I gather from one of your charts that the CINCs and the JCS are also concerned. One of your charts said that the force to be modernized is fewer than desired by the CINCs and the JCS. My question is, why are we not modernizing to our requirements?

FORCE TO BE MODERNIZED...

... BALANCED AND FLEXIBLE
BUT
... FEWER THAN REQUIRED BY
CINCS AND JCS



General THURMAN. A simple matter of the top line allocation of the budget, and then allocating that against the people requirements to sustain the force, the operations and maintenance requirement to keep an operating tempo and provide the spare parts and POL necessary to do that, and to absorb the items of equipment that are coming into the field.

Modernization is balanced then by the residual value of the top line of the budget, and so we are not modernizing as fast as we would like simply because there is not enough money to do that.

Senator LEVIN. So it is a matter of priorities, essentially, in the budget?

General THURMAN. That is right, and top line budget authority.

Senator LEVIN. Have you changed in the last year or so the requirement figures for these five systems?

General THURMAN. Only in the case of the Apache and the UH-60 have I taken out of the equation those items that we indicated before to you that might be used to furnish aircraft for unmanned units. We are not going to buy any aircraft for any unmanned units. So to that extent those are the only numbers that have declined.

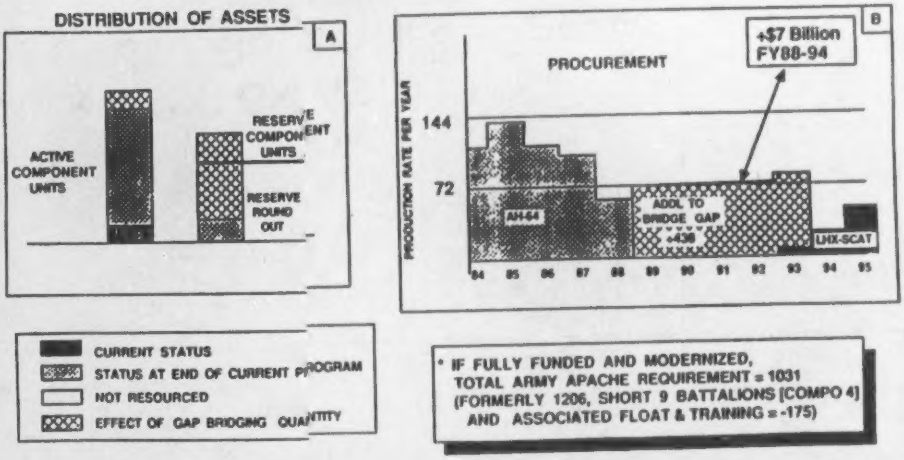
Senator LEVIN. The only requirements that have been changed?

General THURMAN. That is right.

Senator LEVIN. Perhaps you could put up any one of those charts. Put up the one perhaps for the Apache or the Bradley, it does not make any difference. The bridging the gap chart, if you would.

AH-64, APACHE – BRIDGING THE GAP

FY 87 PROCUREMENT OBJECTIVE 675*
CURRENT PROGRAM QUANTITY 593*
EXTENDED QUANTITY TO BRIDGE GAP 1031*



* IF FULLY FUNDED AND MODERNIZED, TOTAL ARMY APACHE REQUIREMENT = 1031 (FORMERLY 1206, SHORT 9 BATTALIONS [COMPO 4] AND ASSOCIATED FLOAT & TRAINING = -175)

For instance, on the Apache, that cross hatch there where it says additional to bridge gap. As I understand it, if we have a gap based on not modernizing as much as we would like to of our requirement, as compared to our requirement, that is what would be necessary to avoid it.

General THURMAN. That is right.

Senator LEVIN. It would cost you $7 billion to avoid that problem.

General THURMAN. That is right.

Senator LEVIN. If we do not bridge the gap there could well be, a greater startup cost for the follow-on system, because the engineers and a number of other investments in the existing system, which could go into the follow-up system, will have been dispersed. Are there additional startup costs likely possible, if we do not bridge these gaps?

General THURMAN. My intuitive judgment of that is, I do not see that as an argument. Now General Wagner has been more extensively involved in the research and development and acquisition than I, but the team of people that we have working, for example, on the LHX program today, there are four helicopter vendors who are not the same group of people who are building today's production helicopter. They are a group of scientists and technologists who are doing the research and development work on LHX so that it will be ready for production in the future.

You would have the notion though that if you had this gap in production, assembly line workers would be moved to other tasks or released to seek other employment. To reassemble the production workers at a later time would involve some costs. Likewise, however, terminating R&D when work begin again would be a problem. But the production side of it and the technical side of it are independent, as I see it.

Senator LEVIN. Could there be additional startup costs if we allow that gap to continue?

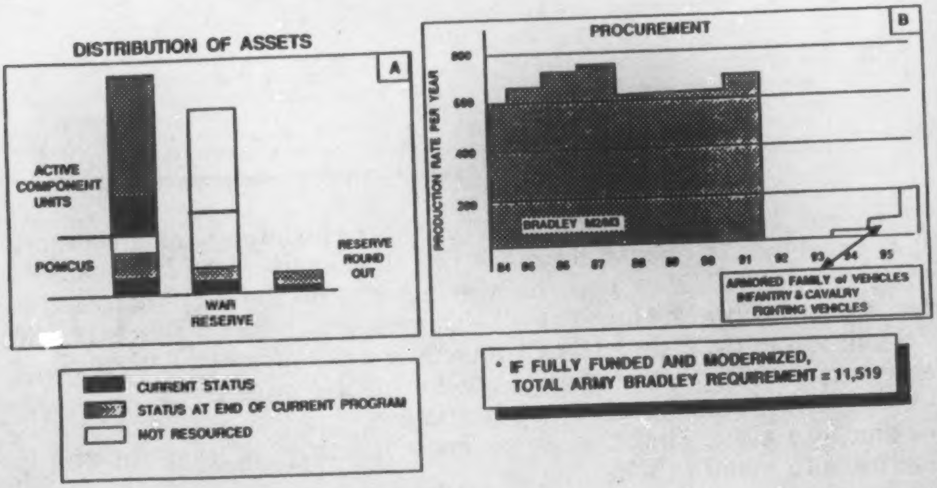
General THURMAN. Marginal at best. The tooling is going to be different out here than the tooling on these equipments.

Senator LEVIN. General, I am going to put a chart up here on the screen and ask you if it is an accurate chart. What we did is we took your requirements for these five systems and we looked at the percentage that we will have modernized to meet these requirements in the last procurement year that you project.

So we have taken the Army's stated requirements. For instance, on the Bradley Fighting Vehicle, 1991, which is the last year you project for it, according to your figures, you would have only modernized 60 percent of your requirement. The follow-on is not scheduled until 1996.

M2/M3, BRADLEY

FY 87 PROCUREMENT OBJECTIVE	6882*
CURRENT PROGRAM QUANTITY	6882*



* IF FULLY FUNDED AND MODERNIZED, TOTAL ARMY BRADLEY REQUIREMENT = 11,519

General **Thurman**. That is right. Now, if you look at chart 22, that interpretation could be made looking at the value of 6,882, which is at the top of the chart, and 11,519, which is in the bottom right corner of the chart. I say you are exactly right.

Senator **Levin**. And again, the reason that we have that gap, and it is pretty dramatic, for instance, on the Bradleys, 60 percent will be modernized by the time we terminate the line and create a gap of 5 years before its follow-on is scheduled.

In the case of the helicopters we have got 36. And I believe that is 49 percent. In the case of the rocket launcher, 49 percent and so forth.

General **Thurman**. I would disagree with you a little on the UH-60 Black Hawk because I discounted the number of vehicles that are in unmanned units. But the theory is appropriate.

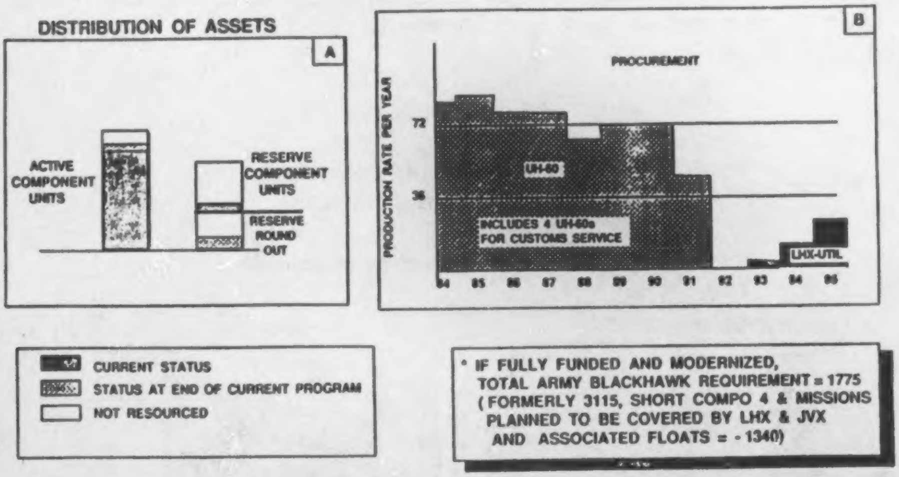
Senator **Levin**. And those figures will be fairly close in any event.

General **Thurman**. They will be close.

Senator **Levin**. Even on the helicopter.

UH-60, BLACKHAWK

FY 87 PROCUREMENT OBJECTIVE	1107*
CURRENT PROGRAM QUANTITY	1107*



* IF FULLY FUNDED AND MODERNIZED, TOTAL ARMY BLACKHAWK REQUIREMENT = 1775 (FORMERLY 3115, SHORT COMPO 4 & MISSIONS PLANNED TO BE COVERED BY LHX & JVX AND ASSOCIATED FLOATS = -1340)

General **Thurman**. My notion on the helicopter would be more like, on chart 28, would be more like 1,107 out of 1,775 because I brought in the JVX, which the Marines are producing, I discounted that from the Black Hawks. So I disagree with you on Black Hawk.

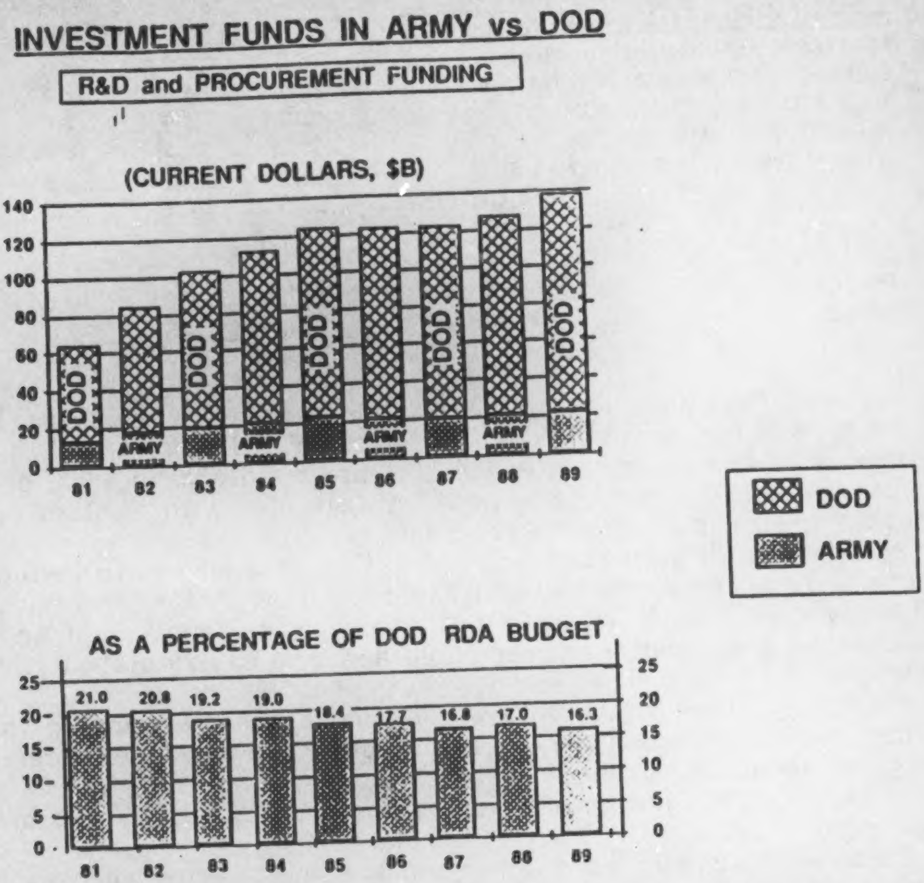
Senator **Levin**. Other than that you would agree that that chart is an accurate representation. Now does this concern you?

General **Thurman**. Of course it does.

Senator **Levin**. Has the Army been fighting at least internally for funds to avoid this gap?

General THURMAN. Absolutely. I put in a POM addendum that said I need $77 billion more, but those funds are not available.

Senator LEVIN. Now on one of your charts you show that Army investment funds are going down as a percentage of DOD investment funds.



General THURMAN. Yes, sir.

Senator LEVIN. I do not have the chart number. Yes, that is it. Can you explain why it is that the Army investment funds are going down as a percentage of DOD investment funds?

FY88 - 89 ARMY BUDGET SUMMARY

(TOA IN $ BILLION)
[WITH SUPPLEMENTAL]

APPROPRIATION CATEGORIES	1987	1988	1989
MILITARY PERSONNEL	28.3	29.2	29.3
OPERATIONS AND MAINTENANCE	23.1	24.8	26.7
MILITARY CONSTRUCTION	3.3	3.4	3.6
[RESERVE COMPONENTS]	[8.0]	[8.5]	[8.9]
STOCK FUND (WAR RESERVES)	.1	.3	.4
SUBTOTAL	54.8	57.7	60.0
BALANCED BY:			
PROCUREMENT	15.9	16.2	16.6
RDT&E	4.8	5.5	6.0
TOTAL	75.5	79.4	82.6

General THURMAN. The answer to that is, I have a fixed cost. I have a fixed end strength. The Chief of Staff and Secretary of the Army fixed the end strength of the Army at 781,000 in 1983, because we looked ahead at the problem associated with whether or not the top line budgets would ever decline.

So I have a 781,000 man Army, I have a modest growth in the Reserve component, the National Guard and Army Reserve. With the pay raise, which is put in by the Office of Management and Budget, that will cause my personnel accounts to go up about 1.9 percent.

So steady state in the Active component, modest ramp-up in Guard and Reserve and the pay raise require the personnel budget to go up about 1.9 percent.

Senator LEVIN. Now we are talking about the Army share of investment.

General THURMAN. But I am trying to come to grips with that. Now the second piece is that, I have to set aside the operations and maintenance money for the onslaught of equipment which has arrived, and I never get rid of any equipment. It is bumped out into the Guard and Reserve and so when I look at the overall operations and maintenance budget, it is up on the order of about 6 percent.

I straight lined the facilities budget, no increase, by about $100 million on a $3.4 billion budget, which leaves then the residual monies available for research and procurement. So when you then calculate procurement it turns out to be a declining share.

Senator LEVIN. Is that not true in the other services, that same problem?

General THURMAN. I would say it is not necessarily true because I looked at the other services' budget. In the case of the Air Force, I recall their budget for procurement in 1988 is $32.5 billion, and in

1989 it goes up to about $38 billion. The Navy goes up about $4 billion. Our budget is essentially flat in the procurement accounts.

Senator LEVIN. If you had kept the same percentage of the DOD budget through these years, how much more money would be available for you for modernization?

General THURMAN. The answer is about $2 to $3 billion a year.

Senator LEVIN. So say for the period of 1981 to 1989, you are talking about as much as $20 to $30 billion.

General THURMAN. That is right. I would remind the distinguished chairman that I lost $3.5 billion in Congress last year.

Senator LEVIN. How much did you lose in the DOD this year?

General THURMAN. From the onset? We did not lose much in the DOD. As a matter of fact, the Chief of Staff and Secretary were called in at the last minute and given an additional billion dollars, as I recall.

Senator LEVIN. But you said you argued for more to avoid the gap. My question is how much more have you argued for that you did not get?

General THURMAN. When you say argued for, I presented DOD with the information associated with that $77 billion, and said, look, this is available, and is producible. American industry can do it; now I need the equipment for modernization, but the top line of the budget is what the top line of the budget is.

Senator LEVIN. That is what is given to you. Did you say that you argued for more for modernization?

General THURMAN. We submitted the budget and presented information in the deliberations that are always on how to cut the budget, not how to add to it. Except, in this case in the last moment of the budget preparations, we received I guess about a billion dollars.

Senator LEVIN. Is it fair to say that you argued for more than you got for modernization?

General THURMAN. We presented the information for more modernization than we got.

Senator LEVIN. Thank you. Senator Quayle.

Senator QUAYLE. Thank you very much, Mr. Chairman. General Thurman, is our problem not one of shrinking defense budgets?

General THURMAN. Certainly.

Senator QUAYLE. Is that not the problem, that we are simply just having less money in the last 2 years than we have seen in budget authority actual reductions? When you get right down to it, it comes down to a budget figure, a total budget figure?

General THURMAN. Absolutely.

Senator QUAYLE. Not arguing within the building on how much the Army is going to get, how much the Air Force is going to get, or the Navy, it is the total budget figure that gets cut, particularly on Capitol Hill. Is that not the bottom line?

General THURMAN. The bottom line is the affordability issue associated with the declining budget.

Senator QUAYLE. And the declining budget that gets cut when the defense budget is submitted to Capitol Hill?

General THURMAN. Yes, sir.

Senator **Quayle**. Because if you had had what the President had recommended over these years you would not be in this box that you are in today.

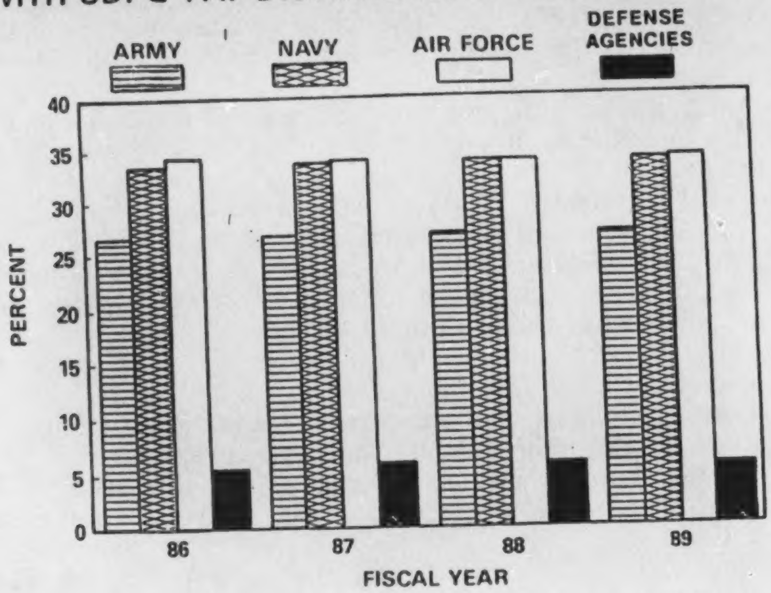
General **Thurman**. We would be in better shape than we are.

Senator **Quayle**. I was just looking at these figures here that you have got. The services' share of the budget, it is going back looking at Army, Navy and Air Force, it has been fairly consistent.

General **Thurman**. Yes, sir. That is right.

SERVICE SHARE OF THE BUDGET

(WITH SDI & PAY DISTRIBUTED TO THE SERVICES)



ARMY	26.5	26.5	26.7	26.8
NAVY	33.6	33.4	33.5	33.8
AIR FORCE	35.6	33.9	33.6	33.6
DEFENSE AGENCIES	4.3	6.2	6.2	6.1

Senator **Quayle**. So you are not looking at any real change in the total amount of dollars. It has been about 26 percent, about 33 percent for the Navy, about 33 percent for the Air Force. As a matter of fact, the Air Force has gone down from 35 percent, according to the chart that you have, down to 33 percent.

General **Thurman**. That is correct.

Senator **Quayle**. You have actually gone from 26.5 up to 26.8 percent.

General **Thurman**. That is right, sir. We are thankful for anything we can get.

Senator **Quayle**. I do not have the Air Force here, but looking at the total share of the defense dollars, looks like they are the ones who have sort of taken more——

General **Wagner**. Could I make a comment here, sir? When the DOD normally picks a start point, they take last year's budget and ask what they think the allowable growth would be. Last year we came in with a proposal to the Congress, and it was cut $2.7 billion, which gave us a −11 percent real growth.

So when we got ready to start this year, even putting real growth on top of that, that put us down over $2 billion from what we thought we would be several years ago.

Senator **Quayle**. But the point is on the total dollars of the budget, that the Army is getting about the same.

General **Thurman**. Right, sir.

Senator **Quayle**. When you talk about, about the same as the percentage, I mean the fair allocation, the problem is that the allocation of the dollars for everyone is not enough.

General **Thurman**. That is correct, sir. And what I have tried to explain to you is our strategy for managing through that amount. And the strategy for managing through that is that you can not have everything that you would like to have and therefore certain production lines will ultimately close as other production lines open.

For example, as I indicated to you, in the case of the trying to buy the communications equipment for Mobile Subscriber Equipment that we need, we got in, bought it quickly and will get out. We will not have a continuing line about that. That is the ebb and flow of the situation.

Senator **Quayle**. Given that you are probably going to get about the same percentage of defense dollars, given that the Congress is going to be unwilling to increase defense budgets and it is going to be rather parsimonious in that category, where do you foresee these cuts in the Army are going to come from? You are going to have to make these decisions. Where are you prepared as far as to recommend?

General **Thurman**. We have made that recommendation. For example, we made the recommendation that given the fact that I do not have enough money in the aggregate, I said in the specific that we will have to cut down the Apache line to nothing. You have to make those tough decisions.

Senator **Quayle**. As compared to what? What are your priorities? What the priorities of the Army? One through three. What are you most interested in?

General **Thurman**. Are you interested in acquisition or total budget?

Senator **Quayle**. Acquisition, No. 1.

General **Thurman**. Okay. Acquisition, No. 1 is to assure——

Senator **Quayle**. Acquisition is the first priority of the Army?

General **Thurman**. No, that is not the first priority.

Senator **Quayle**. How about the priorities of the Army? When you sit down and you are going to allocate——

General **Thurman**. Force structure, No. 1 and people, No. 1. If you do not have the people and the force structure, you do not have an Army.

Senator **Quayle**. What is number two?

General **Thurman**. No. 2 is assuring sustainability of operational tempo and sustainability for combat of the equipment on hand.

Senator **Quayle**. What would be number three?

General **Thurman**. No. 3 is the residual of acquisition split between modernization and research and development.

Senator **Quayle**. Do you have a fourth one?

General **Thurman**. Those are the three major ingredients.

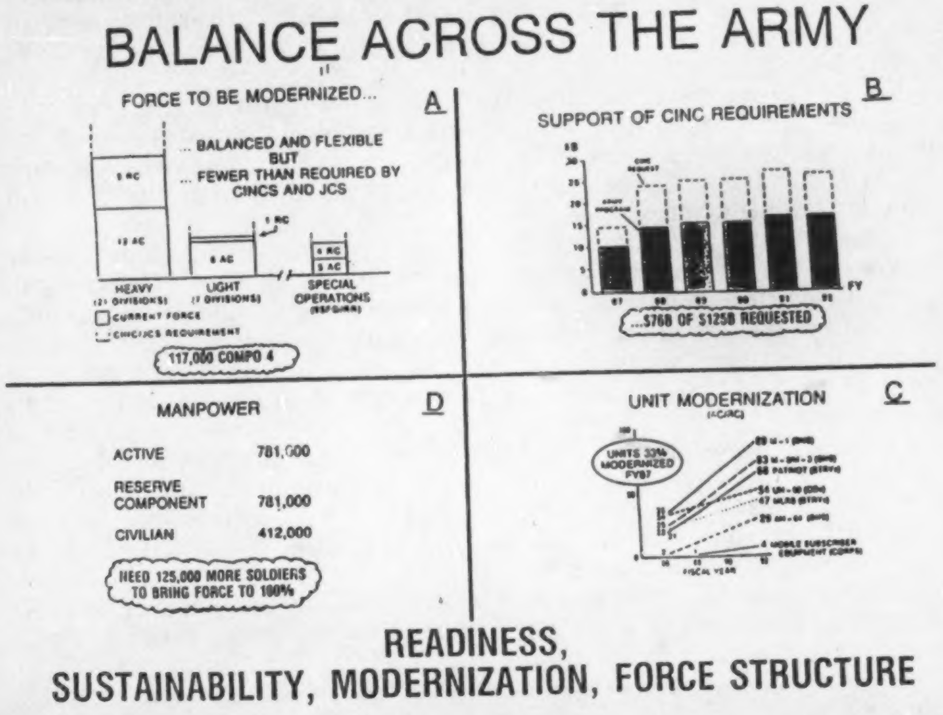
Senator **Quayle**. Now on the decision to terminate the Apache line, that falls into the third category?

General **Thurman**. That is right. We just cannot afford it.

Senator **Quayle**. So in other words you are very reluctant to get into the force structure at all.

General **Thurman**. I have General Rogers, for example, distinguished CINC in the field, who says, I do not have enough force structure to do the job you have allocated to me. Therefore the Army has to protect what it has, even though it is not enough for his uses.

Senator **Quayle**. What about other places?


BALANCE ACROSS THE ARMY

READINESS,
SUSTAINABILITY, MODERNIZATION, FORCE STRUCTURE

General **Thurman**. Other places same thing. I have indicated on the third from the last chart, I have a shortfall in the current manning, because I cannot raise my 781,000 Army because of an affordability problem.

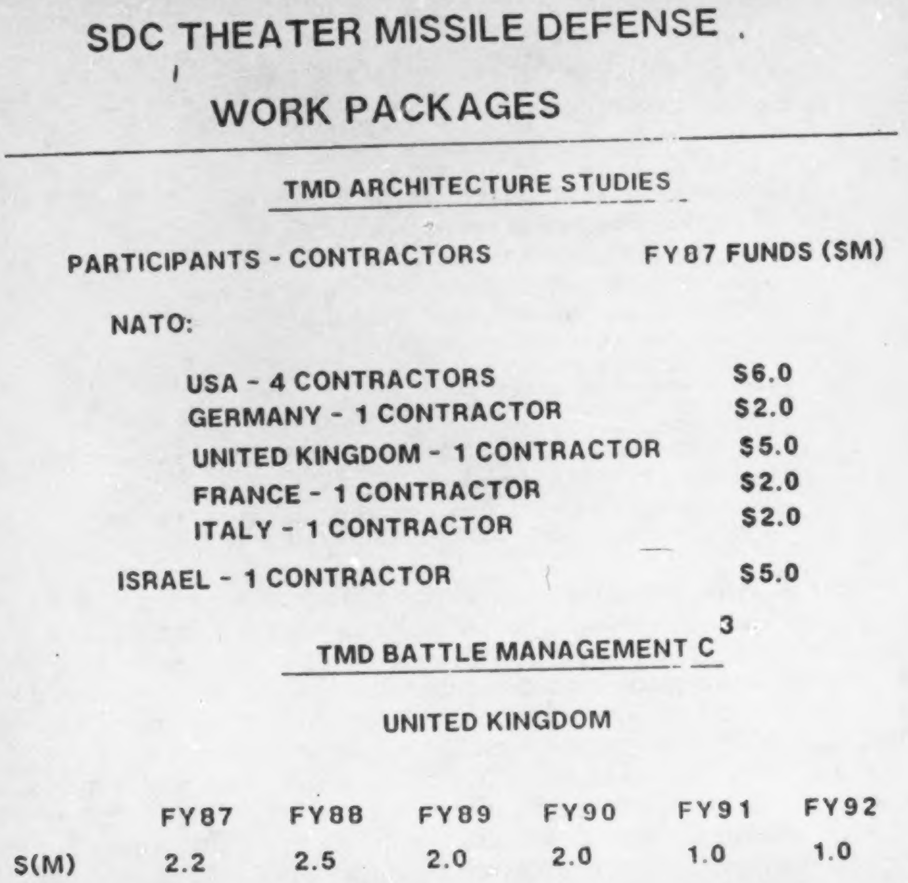
Senator **Quayle**. So you are willing to keep the force structure. You would be willing to give up some of the procurement items?

General **Thurman**. And we clearly have done that.

Senator **Quayle**. That is clearly a choice that you are willing to make?

General **Thurman**. We have clearly done it, sir.

Senator **Quayle**. Let me shift to another subject. As you know, we had the arms control proposals going on in the zero-zero option, that concept has been accepted by both sides. I wonder if you would look at an extended air defense in western Europe. If we have a zero-zero, what additional importance may it, in fact, play?



SDC THEATER MISSILE DEFENSE

WORK PACKAGES

TMD ARCHITECTURE STUDIES

PARTICIPANTS - CONTRACTORS	FY87 FUNDS ($M)
NATO:	
USA - 4 CONTRACTORS	$6.0
GERMANY - 1 CONTRACTOR	$2.0
UNITED KINGDOM - 1 CONTRACTOR	$5.0
FRANCE - 1 CONTRACTOR	$2.0
ITALY - 1 CONTRACTOR	$2.0
ISRAEL - 1 CONTRACTOR	$5.0

TMD BATTLE MANAGEMENT C^3

UNITED KINGDOM

	FY87	FY88	FY89	FY90	FY91	FY92
$(M)	2.2	2.5	2.0	2.0	1.0	1.0

General THURMAN. Yes. As a matter of fact, as you know, or perhaps you do not know, but we have at the present time six contracts operating out of our Strategic Defense Command, looking at the extended air defense anti-tactical ballistic missile game in the NATO region.

We have just appointed a special task force director whose sole job is to manage that particular enterprise; he was just in Europe last week. For example, we now have work going on, with Germany, the U.K., France and Italy and there is a separate contract with another country to look at the extended air defense precisely as you indicated.

Senator QUAYLE. What are you going to be doing on the Hawk, the Patriot, on those programs specifically?

NUNN AMENDMENT - NATO COOPERATIVE R&D PROJECTS

• FUNDING ($M)	DOD	ARMY PORTION
FY86	125	23.2
FY87	200	38.5
FY87 SUPL	60	9

- NO ADDITIONAL MONEY AVAILABLE

- AIRBORNE RADAR DEMONSTRATION SYSTEM (ARDS)
    - MOU SIGNED BY UK AND US ON 1 AUG 86
    - FRANCE MOU PARTICIPANT AS OF 23 OCT 86
- 155MM AUTONOMOUS PRECISION GUIDED MUNITION (APGM)
    - MOU TO BE SIGNED 14 APR 87 (CA,GE,IT,NL,SP,TK,UK,US)
- NATO IDENTIFICATION SYSTEM (NIS)
    - PROPOSED MOU ONLY
- EVOLUTIONARY SAM/MEDIUM SAM
    - NO MOU - US EVALUATING EUROPEAN STAFF TARGET (EST)
- ARMY TACMS
    - NO MOU - US RENEWED CO-PRODUCTION/DEVELOPMENT OFFER
- HAWK MOBILITY ENHANCEMENT
    - ADD ON PROJECT - APPROVED BY DEPSECDEF 22 MAY 86
    - FINAL NEGOTIATING DRAFT BEING REVIEWED

General THURMAN. We are working upgrades under the Nunn initiative. One of those happens to be in Hawk mobility and the like. But more specifically, and more relevant, I think, is the Patriot. We have two modifications to go with the Patriot, called PAC-1 and PAC-2, and we are trying to look at whether we can swing another $30 million to go into Advanced Patriot.

In addition, we have an experiment which was just conducted last year with the Strategic Defense Command, which looks at the FLAGE missile, which is homing in on an incoming reentry vehicle. So we have a robust program to get at that.

Senator QUAYLE. What about the Hawk follow-on?

General WAGNER. The Hawk follow-on is a program that we are tying to get started in conjunction with the Europeans. However, it will be in the mid-1990's. That is the reason we are continuing, at least until the mid-1990's, to upgrade the Hawk with the mobility so we can move about the battlefield and be more survivable.

Senator QUAYLE. The Hawk follow-on will not be until the mid-1990's?

General WAGNER. No, sir.

Senator QUAYLE. Why is that?

General WAGNER. Because of the rate that it is starting up and the fact that, when we look at the technology and the time to develop it, it will take us about that long. We are at a very low level right now, just working with some of our European counterparts.

Senator QUAYLE. What about the threat, the emerging threat, particularly the possible conventional capability of the short-range ballistic missiles, if they go from nuclear to conventional? Is this something that you have studied, are you looking at, is this getting into, what are we doing about it?

General THURMAN. I think that is one of the residual concerns that we have with respect to the negotiations at the moment, that you have to take a look at the missiles and the asymmetry of that. We have not a vehicle that is in that domain.

So, one of the things that we are looking at, for example, is the builddown of the Pershing II to 1B, in order to put up a missile of equal proportions.

Senator QUAYLE. What if we can not do that politically, then where are we?

General THURMAN. If you can not do that, then you have the asymmetry that says you need to get rid of the Soviets' advantage in SRINF at certain ranges. We need to get rid of that group of missiles at the same time, because we have nothing to counter that sort of thing at the moment.

But we are investigating extended air defense, to try to get at that problem.

Senator QUAYLE. This is my point, and I think it is a rather important one. If in fact we are left with that asymmetry after IWF, and if in fact we have the so-called right to match in that area, then to me it seems that extended air defense becomes even more critical.

I am not exactly sure, and on the second round I would like to get into that, of what we are doing in extended air defense. I think you have a new office looking into that. I guess I am a little bit concerned about where we are going on this particular issue, and what kind of priority it has and what kind of attention the Army is really giving it.

General THURMAN. I think you will be happy that we made the investment in a new office. We have been to NATO to work with General Rogers and his staff. We do have R&D contracts on the street. We are trying to make the investment right now in improving the Patriot, because it is already deployed. So we have a number of things rolling in that area.

Senator QUAYLE. I will save that line of questions for my second round. Thank you, Mr. Chairman.

Senator LEVIN. Senator Shelby.

APACHE AND BLACK HAWK HELICOPTERS

Senator SHELBY. Thank you, Mr. Chairman. General Thurman, I want to get back to the Apache and Black Hawk helicopter. According to your charts and your testimony, there is going to be a gap from the time those programs are terminated to the time the LHX comes on line. Is that not a big risk? Are you not gambling?

General THURMAN. That is a risk, and we would like to not do that, but it is a matter that we do not have enough money to keep it open. It is just that simple.

Senator SHELBY. Would a stretchout program help?

General THURMAN. Well it would, but you are buying at less economical rates. The producers of the Apache have been in to us and said, look, we have a multi-year proposal for you for 5 years. Would you consider it? The answer is, we will consider it. The question is, how to get the topline allocation of money to make it happen.

Senator **Shelby**. You are also gambling a lot on the LHX coming on line on time, coming on line and doing the job that we hope it will do. But at the moment it is still experimental.

General **Thurman**. Absolutely.

Senator **Shelby**. So there will be a gap, and if there is a gap there is also a risk.

General **Thurman**. So you make up with it in less capable aircraft, which is the current AH1S Cobra/TOW fleet, for example.

Senator **Shelby**. You hope you make up.

General **Thurman**. Well, you make it up in numbers, not in warfighting capability.

Senator **Shelby**. The Air Force and the Navy, it seems to me, are continuing production of their frontline fighters until the new advanced fighters come on line. Is it because they have perhaps used their resources better?

General **Thurman**. No, I think it is a direct result of the fact that their current budget is $33 billion and mine is $20 billion.

Senator **Shelby**. It is then just a question of money?

General **Thurman**. Sure. I am not arguing about it, I am just saying those are the facts.

Senator **Shelby**. Has the Army made a pitch before this committee or other committees in the House to try to get this additional money that would close that gap? Or if you had the money would you use it somewhere else?

General **Thurman**. The first thing on the buy back list, if we had additional funds, would be to sustain the production of the Apache.

Senator **Shelby**. That is an important priority?

General **Thurman**. Yes, sir.

Senator **Shelby**. How much would that cost?

General **Thurman**. Bear in mind, there is the ancillary gear that goes with the aircraft. So nominally, it is $800 million to $1.3 billion, depending upon the year, depending upon the rate of production for that particular aircraft.

MISSILES IN EUROPE

Senator **Shelby**. Let us go to Europe for just a minute. I believe, the Senator from Indiana, mentioned regarding the upcoming talks that everybody is hopeful that there will be a gap or a risk if we remove our Euro-missiles out of Europe. Will there not?

General **Thurman**. Are you talking about the P-II and GLCMs?

Senator **Shelby**. No. We take the Pershings out.

General **Thurman**. That is right. P-II, Pershing missiles. Well, the theory of all that, of course, is that the Soviets have three times the number of missiles that we do. Therefore, the equation would involve some goodness that would result from reducing the nuclear risk of interchange there by having them do away with three times the number that we have.

We have perceived that conditional upon some other things, like verification, the option to builddown the P-II to the P-1B and the like, those things are risks, obviously, and as the Senator from Indiana indicated, they would still outgun us on a SRINF missile in the 1,000 km range. That is the reason we would want to maintain the builddown option or have them get rid of theirs as well.

Senator **Shelby**. So the zero-zero proposal is not really that. It has got to be more for us to feel a little more secure.

General **Thurman**. Well, it is zero-zero on that specific deal. But then the question is, what lies next below it.

Senator **Shelby**. And then right below it is where we have a risk factor.

General **Thurman**. That is right.

Senator **Shelby**. A big one?

General **Thurman**. We have risk factor. How big it is depends on how good your conventional forces are.

Senator **Shelby**. Do you believe it is in the best interests of the United States to just negotiate the P–II's out of Europe as you are talking about? Or should they include the other Russian or Soviet missiles?

General **Thurman**. I think it has to have the necessary safeguards to assure either we have the builddown capability to the P–1B, or it has to get rid of the Soviet missiles. In other words, all I am saying to you is, there are two ways that are open to negotiations.

Senator **Shelby**. Do you believe that NATO at the present time with conventional forces it has could defend Western Europe for 36 hours?

General **Thurman**. For 36 hours? It depends upon the mobilization sequence you would take me through. We have an obligation to get 10 divisions there, and I would have to go through an elaborate display, which would be classified, but in the main I would say that we could do well. But there are risks associated with any arms limitation deal, provided you have to have the appropriate verifications and appropriate consideration.

Senator **Shelby**. And risks that should really be evaluated and considered before we rush into any arms thing.

General **Thurman**. And I am confident that they will be reviewed by the Joint Chiefs of Staff.

Senator **Shelby**. And I hope by the negotiators. Thank you, General.

Senator **Levin**. Admiral Warner.

Senator **Warner**. My highest rank was captain in the Marines. I must say that I would like to just reminisce a moment, for what little value it may be. But having had over 5 years experience in a military department, namely the Navy, in 1969 the Navy was faced with the following decision: We had over 1,100 ships. We were involved in the war in Vietnam, and we were faced with a modernization program of proportions comparable to what the Army has today.

The civilian heads of that department made the decision not to try to replace those ships on a one per one basis, but to drastically scale down the size of the Navy in order to take the dollars and modernize the Navy. That level of ships, of over a thousand in the next 7 years, went down to around 475. I think this was the lowest figure. Then the Navy began a gradual buildup to its current projected goal of 600 today.

As a part of that decision we made tough calls to close installations. Now I remember closing the Boston Naval Shipyard, the oldest and most historic in America and the battle that ensued in the Congress. I still bear the scars. But the point of it is that we made a decision that we had to modernize, we had to bring down the operational size of the Navy and then rebuild it.

MILITARY PRIORITIES

As I listen to you respond to my colleague from Indiana's questions about the priorities, it is true that we should have as a top priority in all military departments, the people. But I wonder about the wisdom of clinging to that force structure. As you very correctly stated, and by your extrapolations, the dollars involved with holding to that line and supporting the personnel pay raises in the Guard and Reserve has driven the figure for modernization down.

Also during this period, the Army, and I think very wisely, has shifted a good deal of its attention to the Guard and Reserve. I assume that you agree with me, that this is a lesser cost than an active standing force, and it is that Guard and Reserve that is now providing a good deal of standby support for the Army.

But I come back. Obviously the Secretary, whom I admire and has been a lifelong friend, and the Chief of Staff have made a decision to hold to that present force structure, recognizing that it will drive down the dollars available for modernization. Now it may be that you do not have as much discretion as we did with force structure when I was there. It may be that the JCS and the Secretary of Defense are requiring you to hold to the active duty force structure. But would you care to comment on that chapter in history in one military department?

General THURMAN. Yes. I think it is very comparable, as a matter of fact. The Active Army in 1969, in that period of time, had 1.5 million people under arms. And after the Vietnam war it declined to 777,000 people in 1980. So we did precisely what the Navy did, and that was reduce force structure.

Now the question is, do you have commitments that you have to keep. The answer is that we do in terms of NATO commitments and others, meeting CINC's requirements and the JCS requirements. So we fixed on an end strength. As a matter of fact in 1983, General Meyer asked me when he was Chief of Staff, how high can you raise the Army? I had been the recruiting chief and the Deputy Chief of Staff for Personnel of the Army and I said, you can bring it up to 850,000. We said, time out, we cannot afford to raise the force structure of the Army.

So we fixed it, knowing full well that the pace of modernization is the ingredient we would like to complete faster. But, if the money is not available then you cannot modernize at that rate. So I think the similarities are profound.

Senator WARNER. Have you determined that there is nowhere in your overhead structure, base structure and the like, that you could incur some savings that might be applied to the modernization?

General **Thurman**. Just eliminating the program growth, for example, in people alone we freed-up $5 billion out of the Army program in the period 1983–1988, and shoved it toward the modernization business. So by decreasing our appetite in the personnel equation, we have made a substantial contribution to maintaining the modernization program at its current level, even though it is not enough.

Senator **Warner**. I have followed your answers very carefully. I wish to commend you. I think you have been most objective about the situation facing the Army, as compared to the two military departments. So my concluding questions will be just rephrasing, I think, what you have already said.

If I am to understand you, you feel that the Army has been treated with equality with the Navy and the Air Force as the overall Department of Defense has been faced with the cuts largely brought on by the Congress.

General **Thurman**. I am not pinning it on the Congress, sir. I would say we have been treated with equality. We get fair hearings, and the top line is what the top line is. The Secretary of Defense obviously has to make tough choices and we get fair hearings.

Senator **Warner**. So in your judgment there has been no discrimination among the three military departments.

General **Thurman**. Not in my judgment.

Senator **Warner**. I appreciate that.

Senator **Levin**. Senator Glenn.

M–1 TANK

Senator **Glenn**. Thank you, Mr. Chairman. The Army posture statement for 1988 describes the M–1 battle tank as the centerpiece of Army modernization, and I think everyone agrees with that. Yet the fiscal year 1988 budget calls for a reduction in its production from 800 to 600 per year. I have been told that the total program costs will increase approximately $500 million over the next two years, based on multi-year contract termination charges and increased per unit production costs.

However you figure this out on the numbers it comes out somewhere around $115,000 or $120,000 additional costs per unit, per tank. First, is the $500 million correct?

General **Thurman**. Lou, do you have that number?

General **Wagner**. I am not sure where that number came from. We are negotiating with the contractor, on that multi-year contract, and we are going to take delivery of those 3,000 tanks that we had in the multi-year at a steady state rate of 70 per month for the first year and in subsequent years 60 per month by just adjusting some of the delivery periods.

Senator **Glenn**. What is your increased cost then per tank of the stretchout?

General **Wagner**. If you go from 800 to 600, I will have to provide that, sir. I do not remember that exact cost.

[The information follows:]

M1 TANK COST

The current procurement unit cost of the Abrams tank increases from $2.3 million in the fiscal year 1987 program when we are building 800 tanks to $2.6 million in the fiscal year 1988 program when we are building 600 tanks. Of the $.3 million difference only $.041 million are attributed to the change in quantity.

The major contributors to the current procurement unit cost (CPUC) increase from the fiscal year 1987 column to the fiscal year 1988 column of the President's budget ($2.563M-$2.303M=$0.260M) are as follows:

		Million
Inflation based on 4.5 percent annual rate		$0.116
Hardware changes:		
Engineering change orders	.25	
Block II start-up and item purchase	.013	
Classified	.019	
Total hardware changes		.057
Test sets—increased buy to make up shortfalls		.046
Fixed costs spread over smaller quantity (800 vs 600)		.041
Total unit cost difference		.260

Senator **Glenn**. Well, the figure last year, when we were talking 840 to 720 was $100,000 per tank.

General **Wagner**. Yes, it is about that.

Senator **Glenn**. This is in that general category. I hate to see us stretching things out and adding to the per unit costs, when we know we are going to have this production eventually.

General **Wagner**. One of the things that changes that cost, sir, you have to split it out between the two tanks. The tank that we will be producing in the next year has some modifications on it the previous ones did not. Improvements in fightability, different commander's hatch, things of that nature, which drive the cost up too, and that takes up some of that.

Senator **Glenn**. As a comment, I do not want to get into a lengthy philosophical discussion here, but I wish that we would present figures on combat equipment from a combat situation. We hear that the Soviets have 21,000 tanks and we have 6,700 grand total in Europe, whatever it is, or we have the Time magazine presentation, the Soviets have so many bombers, we have so many bombers, we are behind so we should build more bombers, is the inference of something like that.

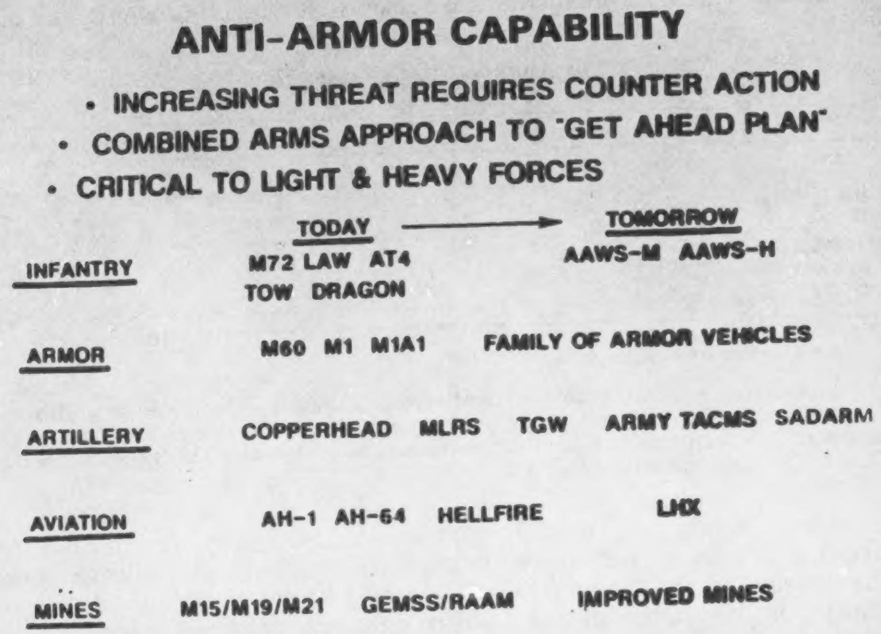
General **Thurman**. We have not said that.

Senator **Glenn**. I know you did not. I am not talking about that. But bombers do not go out and fight bombers. What I am saying is, I wish we would present these combat requirements on what the total picture is on the battlefield, operating from the combat end of things, because that is where battles are won and lost.

OK, tanks do fight tanks, and we are inferior. Then I think at the same time we should show what we are procuring in the way of anti-tank weapons that are shoulder-fired, aircraft-fired, helicopter-fired, land mines, the whole picture that shows the total anti-tank program. Then we know what it is costing us to cope with a 21,000 tank Soviet threat. Part of it is anti-tank, part of it is tank fighting tank, part of it is land mines, part of it is aircraft, part helicopters, but that is the total expenditure to cope with the Soviet threat.

General **Thurman**. That is absolutely right.

Senator **Glenn**. We never seem to present it that way, and that is more a statement than a question.



ANTI-ARMOR CAPABILITY

- INCREASING THREAT REQUIRES COUNTER ACTION
- COMBINED ARMS APPROACH TO "GET AHEAD PLAN"
- CRITICAL TO LIGHT & HEAVY FORCES

	TODAY ——→	TOMORROW
INFANTRY	M72 LAW AT4 TOW DRAGON	AAWS-M AAWS-H
ARMOR	M60 M1 M1A1	FAMILY OF ARMOR VEHICLES
ARTILLERY	COPPERHEAD MLRS TGW	ARMY TACMS SADARM
AVIATION	AH-1 AH-64 HELLFIRE	LHX
MINES	M15/M19/M21 GEMSS/RAAM	IMPROVED MINES

General THURMAN. On the anti-armor capability, these are precisely the elements to what you just described. There is the infantry side of it. The latest thing that is being introduced is the AT4 which we are producing. In R&D there is the Advanced Anti-Tank Weapon System-Medium (AAWS-M) and the AAWS-H, the heavier, which is required because the TOW is beginning to run out of gas.

In case of armor, we have upped the M1, the Armored Family of Vehicles and that is the R&D of the future. Artillery, we have Copperhead, the Sense and Destroy Armor (SADARMs) and terminal guidance munitions. The aviation are those items you just saw, the Hellfire missile and the like. And of course there are the mines and counter-mines.

Senator GLENN. Good. I wish we had time, we do not in my 10 minutes here, to go into these things and the cost and what the total program of anti-tank capability is against the Soviets. I think that way we would really understand it.

General THURMAN. We could provide that for you.

[The information follows:]

U.S. ANTIARMOR VERSUS SOVIET ARMOR THREAT

Army programs and budgets for weapons systems reflect strategy, doctrinal, force structure, readiness, sustainability, and modernization requirements. There is no single assessment which encompasses all of these requirements. Requirements are identified through analyses and assessments which include performance level, system-on-system, force-on-force, and theater level. Specific materiel programs, which are designed to have antiarmor capabilities are analyzed at each of these levels of analysis. The limited summary of some systems capabilities versus threat armor which follows must be viewed in this broader context.

The main battle tank is the keystone of the Soviet armored forces which also consist of armored personnel carriers (APCs), infantry fighting vehicles (IFVs), and other armored vehicles such as self-propelled field artillery. Within the last decade the USSR has dramatically increased its armored vehicle forces by producing 24,000 tanks while the U.S. produced 7,100 main battle tanks. In the European Theater, the Warsaw Pact's armored forces are numerically superior to NATO's as shown below.

NATO-WARSAW PACT COMPARISON [1]

	NATO	Warsaw Pact
Unreinforced: [2]		
Main Battle Tank	19,600	32,000
APC/IFV	32,850	38,000
Fully reinforced:		
Main Battle Tank	24,250	52,000
APC/IFV	41,500	54,000

[1] Source—Soviet Military Power 1987.

[2] In Place in Europe and Rapidly Deployable Forces.

The Department of Defense 1987 Antiarmor Munitions Master Plan will be published in April 1987 and forwarded to Congress to provide a single, integrated DOD document that explains the plan for development and acquisition of antiarmor munitions. The Army program follows:

[Deleted.]

Senator GLENN. I would appreciate that very much. On this threat analysis, or net assessment, I wish the whole defense budget was presented that way. Then we would know what our combat capability is. We never get around to connecting these things up, and yet they all have to work together on the battlefield.

No. 2, you mentioned, one of your slides earlier on there showed a rapid response as one of the objectives and we all agree with that. We have had very disturbing testimony the last few days, looking into combat support and combat service support. Dr. Schlesinger some time ago testified that the Persian Gulf represented a high risk contingency area, Achilles heel of our deterrent strategy.

Secretary Jim Webb, while Assistant Secretary of Defense for Reserve Affairs, cautioned that over 90 percent of the Army's combat service support units are in the National Guard and the Army Reserve. As a result, if a war started overseas, he said, the force structure may not survive long enough for the backup units to get there.

In later hearings, the commander of U.S. CINCCENT, General Crist, who has a responsibility for that area said, and I quote, "Very little progress has been made in bringing U.S. CINCCENT required combat support, combat service support units to a combat ready status."

Today, 38 percent of the CS/CSS units are not combat ready. This situation is particularly pronounced in the Reserves, which constitute 50 percent of our total CS/CSS forces. That is a real weakness, it seems to me. Are you bringing that up to—what are you working on in that area?

General THURMAN. Two items. First of all, in the procurement account. That is where you get into the modernization of the Guard and the Reserve, which may be derivative of the modernization of the active.

Now last year we delivered $1.9 billion worth of equipment to the Guard and Reserve. This year, $2.1 billion, next year $2.1 billion. So the equipment is beginning to flow and has been going into the Guard and Reserve.

On the other hand we have strength problems based upon geographic problems in the Guard and Reserve. We are trying our best. The GI bill, for example, has been an enormous benefit for that, in terms of trying to perk up the Guard and Reserve strength.

But, just 10 days ago the Reserve panel reported out to the Secretary of Defense that they need $16 billion worth of equipment to outfit the Guard and Reserve. That is at the heart of the Army's procurement problems.

Senator GLENN. That is something we want to follow and whatever you can do to bring that combat service and combat service support units up to stuff, those are going to be critical. It is not as sexy as talking about F-15 fighters and M1 tanks and all the other things. But what is going to see us win or lose, it seems to me, is whether we can get our sustainability up, and that is what we are talking about.

General WAGNER. Over the last several years we have put a lot of extra dollars into combat service support, for example, in things like forklifts and trucks and materiels handling equipment to make them more efficient, and have really been able to take people out of that, because we could move so much more efficiently.

Senator GLENN. With the testimony we have had we still need a lot of work in that area. That is a weakness that we want to address along with you.

AMMUNITION

Another thing, on governmental affairs, we have had hearings recently in which the GAO, the General Accounting Office, has been looking into inventory of ammunition and so on. They testified that their investigation so far with the Air Force was that they could not tell with certainty in the Air Force within one-third of what their ammunition readiness was in the ammunition and spares account. I think spares were included in that. I know ammunition was.

They may have a third more than we think they have, or they may have a third less. And, even more disturbing was that, they are the best of the services, with the look that GAO has taken so far. Now I ask specifically, how about in the Army?

Do we have an active inventory count of things like TOW missiles, shoulder-fired Stingers, weapons like that? Apparently the GAO's impression at this stage of their investigation is that we do not know within a third in the Air Force and the other services are worse.

Now, if that is true, and I will get your comment in a second, if it is true, then we have one tremendous upgrading of our inventory account and our management of those accounts to know what we have. Otherwise we do not know what to even vote for here in the way of money to get readiness up to where it should be with regard to missiles and ammunition and so on.

General THURMAN. My comment is one, I have not seen the GAO report. Two, just on the surface of it though, taking the missiles alone, where we keep extraordinarily accurate counts about that, I would dispute that intuitively. Now I have to get the report and look at it.

On common, everyday ammo, to give you an example of the M1A1 tank, I have insisted that when the tank goes overseas it takes with it 60 days worth of warfighting stocks of ammo. So I can tell you in a specific line called the 120mm round, we have tight control on what that is.

Senator GLENN. In that specific round, and the overall ammo accounts and so on, we have to vote money every year here, of course, for replenishment of whatever, for training or for war stocks. You think those are accurate accounts, and more accurate, can you tell within an accuracy level of plus or minus one-third what you have?

General THURMAN. I would say much better than that. Again, I have not seen the report, I do not know what they looked at.

Senator GLENN. The report is still being prepared but the Air Force part of it has already been reviewed. They are still investigating in the Army and the other services.

General THURMAN. I would be happy to stand on the investigation finding. I think we are better than that.

WAR RESERVE STOCKS

Senator GLENN. You indicated a while ago that, there were no war reserve stocks, if I heard you correctly, for aircraft.

General THURMAN. That is right, sir. I do not believe that any service has them.

Senator GLENN. None whatsoever?

General THURMAN. Clearly we do not and I do not think the Navy or Air Force do.

Senator GLENN. What do you depend on, because that came as a shock to me when you said that, that we do not have any preparation at all for that. Do we depend on current procurement then for war reserve?

General THURMAN. You compute the use of the aircraft and you try to put up the fleet of aircraft that will take you through a reasonable period of time. But the answer is, I do not buy war reserve stocks for helicopters.

I will tell you what I have just done while bringing on the Black Hawk. I have taken the first steps in order to get around that.

Senator GLENN. You are talking about total aircraft that would be stockpiled or something. I assumed what you meant was parts and major components, engines and so on.

General THURMAN. No, no. Parts we buy, but not airplanes themselves.

Senator GLENN. You talk about stockpiling whole aircraft.

General THURMAN. That is right. No one does that.

Senator GLENN. OK. No one does that. One other question, you indicated on the UH-60 that we are past 100 ECP improvements now. Are those contractor or government mods we asked for?

General THURMAN. Both.

Senator GLENN. This has been one of the difficulties all through the years. When I was in the testing and procurement business myself I know we used to kid the contractor, only half-jokingly, that they ought to give us the airplane and live on the ECPs.

In those days they could have done that. I hope we are not getting into that kind of situation again. We were modifying so much as we go along that we are in effect doubling the cost of the basic vehicle that we bought in the first place.

General **Thurman**. No. But I would say to you for example, the original Black Hawk came into the fleet with red lights in the cockpit. Red lights and night vision goggles do not go well together. So we changed that to blue-green in order to get more efficiency into the night vision goggles.

I do not think that they are gold-plated from the point of the contractor. We enter into the dialogue. I tell the contractor, that nobody in the chain of authority, up to my level, can turn down a safety engineering change. If it is for safety purposes they have got to give it to them.

Senator **Glenn**. The red light one is the one that any good mockup board should have caught in the first place.

General **Thurman**. I am just trying to say to you, it did not. So therefore we cut it in.

Senator **Glenn**. We had better improve our original procurement specs so it reflects something that is more accurate.

General **Thurman**. The LHX is providing performance requirements which will address the problem in spades.

Senator **Glenn**. Thank you, Mr. Chairman.

Senator **Levin**. Thank you. Senator Cohen?

General **Thurman**. We did not fly night vision goggles back in 1976. Now we do.

NO END-STRENGTH REDUCTIONS

Senator **Cohen**. General, I came in on the end of Senator Warner's questioning, and I picked up that one of the basic decisions that you have made was not to reduce end strength, compared to the Air Force or Navy. The Air Force has cut down the number of wings. The Navy has made some reductions in end strength and put the money into equipment and modernization.

General **Thurman**. I do not believe the current budget shows the Navy or Air Force have reduced end strength.

Senator **Cohen**. You both maintain the same end strength?

General **Thurman**. No, in our case we fixed the Active component end strength in 1981. Senator Warner commented that in 1969 they had 1,100 ships and they cut it, and I said yes, in 1969 we had 1.5 million people in the Active Army. We have cut it down to 781,000. We have not grown in Active component end strength since 1983, except for 1,000 people.

Senator **Cohen**. But if a tradeoff is to be made, you would keep the end strength and try to stretch out what you have got in terms of modernization?

General **Thurman**. That is correct. We have overseas requirements and CINC requirements that say you need people. As Senator Glenn indicated, we do not have enough people in the combat service support game, so we see the strength being what the strength is.

Senator **Cohen**. How much is your R&D budget right now?

General **Thurman**. $5.5 billion, sir.

Senator **Cohen**. Maybe the Chairman can refresh my recollection. What is the budget request for SDI?

Senator **Levin**. $5.9 billion.

Senator **Cohen**. So the SDI budget is larger than the entire R&D effort in the Army.

General **Thurman**. Yes, sir.

Senator **Cohen**. Are you familiar with the initiative that Senator Nunn and I took last year in terms of trying to pare down some of the funding going to SDI to put it into what we call CDI (Conventional Defense Initiative)?

General **Thurman**. Yes, sir.

Senator **Cohen**. Did you support that effort?

General **Thurman**. Yes, sir. I mean we took whatever assets we could get out of that and tried to use it wisely. We tried to get approval.

General **Wagner**. We are still working with OSD to get our share of that. Looks like we are going to come out pretty good on our share of that.

AIR LAND BATTLE

Senator **Cohen**. I recall there was quite a bit of excitement several years ago when we had discussions about AirLand Battle 2000. I have not heard much about that since that time.

General **Thurman**. As I indicated in the opening gambit, the acquisition proceeds from a doctrinally based requirements process. So, for example, one of the things we have a heavy investment in at the moment in R&D is to develop the deep attack capability which will allow us to hit the Soviets second echelon. This is part and parcel of the AirLand Battle doctrine.

Senator **Cohen**. But to the extent the R&D budget is reduced, you are going to have problems meeting that particular——

General **Wagner**. But it is strictly tied to the existing deficiencies in our forces required to fight the AirLand Battle. We have started significant projects to include the tech base in some cases, to make sure we are concentrating in the proper area.

General **Thurman**. One of the reasons we have this gap in the early 1990's in programs that I have described to you today is because we are beginning to bring on new systems. For example, the tactical missile system, the All Source Analysis System (ASAS) intelligence fusion and the JSTARS, in order to get at the particular problem of deep attack.

Senator **Cohen**. You skipped over fairly quickly on page 6 in your presentation, in terms of talking about the Apache attack helicopters and how this is going to be extended in fiscal year 1990 with the LHX, which comes on line in 1995. Do you have problems with what appears to be a 5-year gap?

General **Thurman**. We would like to have something other than the gap. But that is the way the funding breaks, and we will just have to shut it down.

Senator **Cohen**. What is your assessment of the LHX right now? It has been reported about fairly extensively in terms of its costs. What are your projections?

General **Thurman**. The cost estimates come in between $5 million and $7 million.

Senator **Cohen**. And total purchase?

General **Thurman**. Current planning figures call for 4,500 aircraft to allow us to retire some 7,000 Vietnam era aircraft currently in the inventory in order to provide significant operation and support cost reductions.

General **Wagner**. The current estimate envisions about $66 billion to develop and procure the LHX fleet. That is the full life of the buy, to develop and buy 4,500 helicopters.

AIR DEFENSE SYSTEM

Senator **Cohen**. I did not see any reference. You mentioned air defense system here. That raises the flag of DIVAD. What is the son of DIVAD called? Is it the line of sight, forward heavy——

General **Thurman**. Line of sight, forward heavy and we will open the test range on July 1 of this year. It appears that four vendors will show up to begin to run the test. What we will look for in the tests is a series of minimum requirements and objective systems, and then what the growth pattern is for that.

Senator **Cohen**. If the committee were to add money back into the budget, what would be your priority relative to the Apache, the Bradley and the M1s?

General **Thurman**. The first one we would add back would be the Apache. The Bradley is not in the contest at the moment because that is not an immediate drill. AHIP is an immediate drill but the other two systems continue to run through 1991, so it is not germane at the moment for the budget considerations, 1988 and 1989.

Senator **Cohen**. So Apache and then M1?

General **Thurman**. I would say the Apache is one, and then the ancillary equipment for the Guard and Reserve, which gets into outfitting. The associated items of equipment would be two, followed then maybe by M1.

VOLUNTEER ARMY

Senator **Cohen**. Let me switch and ask another question concerning the volunteer army. You have been a pretty strong supporter of that.

General **Thurman**. Yes.

Senator **Cohen**. How is it continuing to function?

General **Thurman**. In a word, dynamite. All services probably have the highest quality of young men and women presenting themselves for entry to the Armed Forces of America in recent memory. The hallmark of all that has been the GI bill resurgence. That is also gone into the Guard and Reserve and the quality increase in the Guard and Reserve is staggering.

I would just say to you that when I was recruiting chief, a lackluster recruiting chief in 1980, half the kids I brought in were high school graduates. This year 92 percent are high school graduates. That year half the kids were of mental category 4. This year 3 percent are mental category 4.

So if there is ever a success story about the workings of the Congress along with the people in the military, it is the volunteer system as we currently know it. I would hope that we could get the Congress to continue to support us, because the people side of the services is not a problem. I just say to you it has brought with it a euphoria of not having to put up with absent without leave, reduced drug problems by three quarters, lowest rate of desertion and crimes against property in 40 years. So all of that is happiness with the non-commissioned officers and young officers in the field.

Senator COHEN. I think I should explain to the people attending this hearing that we did not rehearse that question and answer before coming here.

General THURMAN. You hit my good button. It just comes right out.

WOMEN IN THE ARMY

Senator COHEN. One final point. What about the role of women in the Army? You talk about what kind of performance they have had, success they had had, what roles. As you know, a number of initiatives are still floating through Congress. Senator Proxmire and myself have one dealing with combat support missions and so forth. But tell me about the role of women.

General THURMAN. The role of women is one we value and women make up about 10 percent of our enlisted force and about 10 percent of our officer force as of the end of fiscal year 1986. They are doing a dynamite job in the field. On average they get promoted faster than their male counterparts. Their reenlistment rates are now going very well, we think.

So, business is good, with respect to the quality young women who are coming and staying with us. We are now growing a good quality noncommissioned officer corps. Back in the late 1970's and early 1980's, we did not have enough NCO role models for the women to observe. But I say to you, it is going very well.

Senator COHEN. That is all I have, Mr. Chairman.

Senator LEVIN. Thank you, Senator Cohen. Senator Cohen raised one question relative to the son of DIVAD, as he put it. You have a July 1 deadline on that. Is this acquisition approach the one which the Army recommended and planned to use prior to the language in the Appropriations bill last year?

General THURMAN. No, sir. We had a more extended timeline. But the——

Senator LEVIN. If there were no binding language in that Appropriations bill, would you stick to your original plan?

General THURMAN. The original plan probably would.

Senator LEVIN. So you do not recommend that language in that bill?

General THURMAN. We did not.

Senator LEVIN. On the top down figure Senator Quayle and you have talked about, it is obvious that once you were given a figure you have got to work within, you have to then make certain priority judgments.

General THURMAN. Yes, sir.

Senator LEVIN. That is what you mean by top down?

General THURMAN. Yes, sir.

Senator LEVIN. You have not made the decision, you and the Army, that we are going to increase SDI this year by $2.5 billion instead of eliminating the gap on the Bradley. That is not your decision, is it?

General THURMAN. No, sir. Although the Bradley was perceived to be a buy of the exact number we have in there.

Senator LEVIN. I thought there was a gap on the Bradley.

General THURMAN. There is a gap, the gap you asked us to look at, closing the gap between that and new procurement, but we have always stuck to a number of 6,882.

Senator LEVIN. Let us take the Apache.

General THURMAN. The Apache is the only one that is cut off immediately.

Senator LEVIN. In every case, we are falling short of our requirements.

General THURMAN. Yes, sir.

Senator LEVIN. That is the issue. You did not decide to fall short of our requirements. You took a certain package of money which the folks up above you decided you were going to get, and said that within that limitation, you could meet the requirements. Is that not true?

General THURMAN. That is correct.

Senator LEVIN. So how that division is made above you is not your decision.

General THURMAN. Correct, sir.

Senator LEVIN. It is our decision. We have got to decide whether to put $40 to $50 billion in a Midgetman, or wipe out all of those gaps, plus $20 billion left over spare parts and ammo. That is our decision. That is not your judgment. You do not have that judgment.

General THURMAN. That is right.

Senator LEVIN. So we have got to make that decision. We have got to decide do we increase the SDI research budget by $2.5 billion this year, or meet our requirements on modernization more closely. That is the decision we have to make and this committee has to fight for.

So inside the budget process, while it is very true, obviously, what you say, that you take what is given as a top down decision and then allocate it to force structure modernization and so forth, I think we all have to realize that that is a very different judgment than the one that we are making.

General THURMAN. Yes, sir.

CONVENTIONAL DEFENSE

Senator LEVIN. Now, we are responsible for conventional defense. We are talking about eliminating a number of nuclear weapons in Europe and I happen to favor that approach. But I also believe that as a result we are more than ever required to improve our conventional defenses. That is our responsibility, it seems to me, on this committee, speaking as its chairman. That happens to be my own personal priorities too, but it is also the responsibility of this committee. We have got to make that judgment.

That is why I asked at the beginning, I would like you to just expand a bit on this question. Are you concerned by that chart you showed us this morning and that I put on, showing us falling short of your requirements in terms of modernization, and if so, how concerned in terms of the conventional defense requirements that we have? How much does that trouble you?

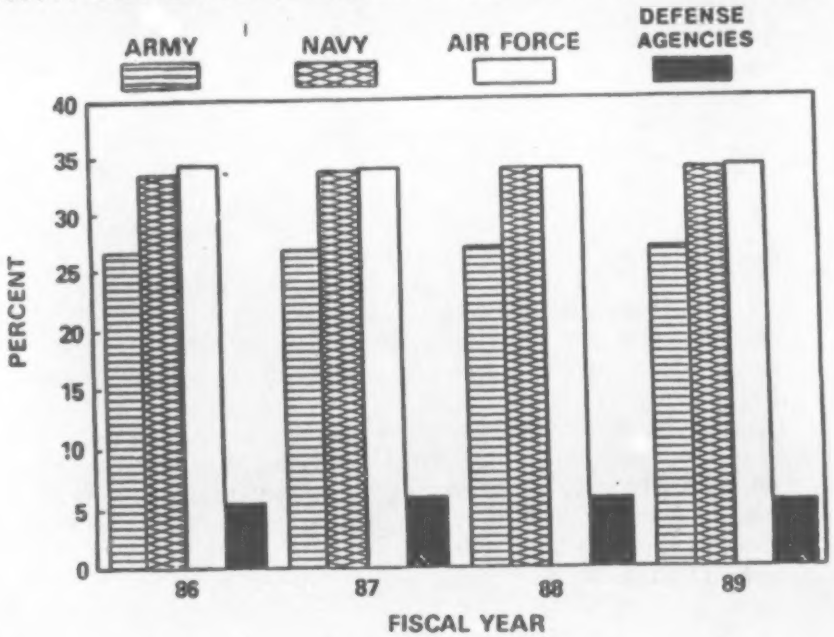
General THURMAN. Well, it troubles us on the grounds that the Army believes that you can make a substantial improvement in conventional force deterrence if your systems are fully modernized. As you look ahead to technological things that are under R&D at the moment, we believe that they can make a substantial gap closure in terms of improving our warfighting capabilities.

So it does concern us. The fact though is we live within our means and we curtail, we eat appetite suppressant pills, in order to assure that we can fall in within the top lines that we are allocated.

Senator LEVIN. And that is allocated by the DOD to the Army?

General THURMAN. Yes, sir.

SERVICE SHARE OF THE BUDGET
(WITH SDI & PAY DISTRIBUTED TO THE SERVICES)



	86	87	88	89
ARMY	26.5	26.5	26.7	26.8
NAVY	33.6	33.4	33.5	33.8
AIR FORCE	35.6	33.9	33.6	33.6
DEFENSE AGENCIES	4.3	6.2	6.2	6.1

Senator LEVIN. Now you have given us a chart, showing the allocation of SDI in the service share of the budget. Are you familiar with this chart? I guess it is chart 10.

General **Thurman**. I do not think it has SDI on there.

Senator **Levin**. You have allocated SDI to the services. Would you do this for us? Would you give us a different chart for the record, showing us how that would look with SDI allocated to defense agencies the way it is in the budget? Would you redo that chart for us, for the record?

General **Thurman**. Yes, sir.

Senator **Levin**. Putting the SDI in the black column, where the budget puts it.

General **Thurman**. Yes, sir.

Senator **Levin**. Second, would you also give us a chart showing the Army's share of the budget over the same period of time that you have given us investment funds in the Army and the overall DOD budget. In that chart, you have given us the 1981-1989 timeframe. But in the Army's share of the budget chart, you have only given us the last 4 years.

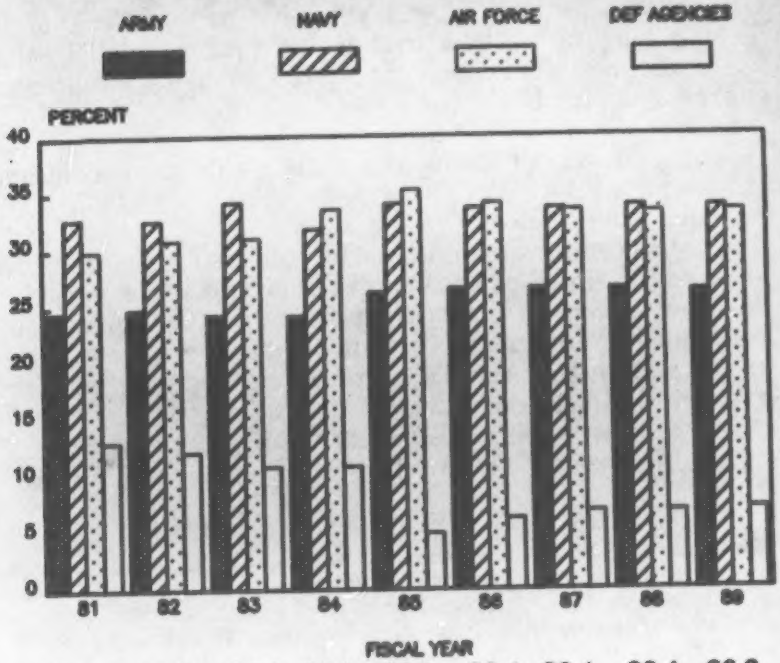
General **Thurman**. Yes, sir. We will provide that.

[The information follows:]

Service Share of Budget

The following chart shows service shares of the DOD budget for fiscal year 1981-89. However, it should be noted that changes to the Army TOA base have occurred since fiscal year 1981 which make comparison difficult. The most notable transfers are: Family Housing appropriation in fiscal year 1983; Retired Pay Accrual in fiscal year 1985; Civilian Health and Medical Program Uniformed Services (CHAMPUS) in fiscal year 1988.

SERVICE SHARE OF THE BUDGET



ARMY	24.5	24.7	24.2	24.1	26.1	26.4	26.4	26.4	26.2
NAVY	32.7	32.5	34.1	31.7	33.9	33.5	33.5	33.7	33.6
AIR FORCE.	29.8	30.7	30.9	33.4	35.1	33.9	33.3	33.1	33.2
DEF AG/CONT	13.0	12.1	10.8	10.8	4.9	6.2	6.8	6.8	7.0

Senator LEVIN. Is it possible that would give us somewhat of a different picture in terms of the Army's share of the budget in the first half of this decade?

General THURMAN. I do not think so.

Senator LEVIN. Well, let us have that in any event. By the way, do you know the percentage of SDI that was allocated to the Army in that chart?

General THURMAN. Yes, sir. It is about $1 billion in 1988 and $800 million this year.

Senator LEVIN. Is that roughly a third of the SDI budget in 1988?

General THURMAN. Roughly a third.

Senator LEVIN. It is about a quarter.

General THURMAN. This year it is a third, and next year it is a quarter.

Senator LEVIN. Why do you not supply that for the record for us. The breakdown of the allocation of SDI on the chart where it was allocated. Okay?

General THURMAN. Yes, sir.

[The information follows:]

SDI ALLOCATION

The following is a breakout of Total SDI Funding and the Army share of SDI:

[In millions of dollars]

	Total SDI	Army SDI
Fiscal year 1985	1,388	512
Fiscal year 1986	2,675	820
Fiscal year 1987	3,229	1,088
Fiscal year 1988	5,221	1,601
Fiscal year 1989	6,282	1,834

Senator **LEVIN**. On the LHX, General, let me see if the following is accurate. You are trying to get started in this program to build 5,000 helicopters. The purpose of the LHX program is to develop a helicopter that is a lot cheaper than existing helicopters and would cost a lot less to operate.

I understand that the cost difference between the existing helicopters, if we bought them under the same terms as the LHX helicopter, would cost about the same. I also understand that we now think that the operating cost difference would be only between 15 to 20 percent less.

My question is this, why should we terminate existing frontline helicopter programs, spend $3 billion in development, and wait 7 years to get a new generation helicopter that costs just as much, does not perform any better, and offers only marginal operating cost savings?

General **THURMAN**. We are looking at the LHX as a replacement for the Vietnam era fleet of AH1S Cobras, UH-1 Hueys, OH-58 A/C Kiowas, and the few remaining OH-6's. It is not a competitor with the Apache. So you have this group of more than 1,000 Cobra TOW helicopters out there, another group of Scout aircraft, and a fleet of utility helicopters that are now entering their 20th to 25th year of service.

The question is, what about all of that in the year 1995 and beyond? It is back to my assertion to you that you take stock of the threat situation, the fact that we will have composite materials, may be able to get away with one pilot instead of two, may be able to get 8 or 9 hours of operation time out of the aircraft rather than 4 to 6 based upon the maintenance ratios and the like. Therefore, a reduced number of LHX aircraft can do the job of a larger number of older aircraft, and therefore, the aggregate operations and support costs go down, while the overall battlefield capability is increased.

Senator **LEVIN**. OK. Senator Quayle.

EUROPE—SOVIET UNION VERSUS NATO

Senator **QUAYLE**. Thank you, Mr. Chairman. I want to go back to Europe, if I can. Could you describe for us the net assessment on a conventional basis, the Soviet Union versus NATO, in summary form?

General THURMAN. I did not bring that information with me. I can say that tanks outnumber us 2 to 1, or production rates outnumber us 2 to 1.

Senator QUAYLE. The net asessments. Not numbers.

General THURMAN. No. I do not have that with me.

Senator QUAYLE. You had that information on a net assessment. Do you know what some of the problems that we have, from a net assessment point of view?

General THURMAN. The net assessment point of view says that he overmatches us in volumes of equipment and people in a very short timeline. Therefore, we compensate for that with technological superiority and try to get at reducing his quantitative advantage by our qualitative advantage.

The net assessment shows that he can punch through volume of forces, and therefore we have to upgrade and continue to modernize at a higher rate with more modern, lethal smart munitions.

Senator QUAYLE. What does the net assessment say about air defenses, missile defenses?

General THURMAN. With the advent and the arrival of the Patriot and the full modernization of the Patriot missile fleet and the like, the net assessment says that we will do very well against his air-breathing threat. This is in concert with blue air, you know, the U.S. Air Force and our allied air forces.

Senator QUAYLE. The air-breathing threat? Planes?

General THURMAN. Planes.

Senator QUAYLE. What about ballistic missiles?

General THURMAN. It says that we are not good enough in that field. He is better than we are in that field.

Senator QUAYLE. He is better. How about cruise missiles?

General THURMAN. We are better than he is in cruise missiles.

Senator QUAYLE. On defensive capability?

General THURMAN. Offensive.

Senator QUAYLE. How about defensive?

General THURMAN. That falls into the case of air-breathing threat and Hawk and Patriot should be able to work in that region. That is the reason we are upgrading both of those.

Senator QUAYLE. Hawk and Patriot will be able to handle the curise missile threat?

General THURMAN. We believe that they will.

General WAGNER. We have to do some work on Hawk-fusing, to make sure that they can handle that threat.

BALLISTIC MISSILE THREAT

Senator QUAYLE. What about the ballistic missile threat?

General THURMAN. It has to have two product improvements, the first of which is in software upgrades to Patriot. The second of which is software and hardware changes to Patriot to counter ballistic missile capability.

Senator QUAYLE. What will these programs be and when will——

General THURMAN. PAC–1.

Senator QUAYLE. PAC–1, PAC–2 and the follow-on, Hawk, and what that is going to be. Really, we are looking at a dedicated ATBM system. Is that not what we are looking at eventually?

General THURMAN. We have a program going right now with respect to flying an interceptor missile. Through the Strategic Defense Command we have got that program on the books, as well as a competitor in the Patriot game called PAC-3.

Senator QUAYLE. How about the family of threat missiles?

General THURMAN. That is where PAC-1, PAC-2 and Advanced Patriot reach up the line of missiles in order to get at that.

Senator QUAYLE. Do you think PAC-1, PAC-2 and Advanced Patriot will take care of that problem?

General THURMAN. We are not sure about it. We are entering in R&D to do that.

General WAGNER. It would be one piece only of a total program in ATM. It depends on what you want to defend.

Senator QUAYLE. I do not just want self-defense. I want area defense.

General WAGNER. If you want to expand and protect that entire country, it becomes very difficult.

Senator QUAYLE. What if you want more than just self-defense?

General THURMAN. That is the reason I said we have commissioned the architectural studies trying to get at that. So all I am saying to you is I have got the architectural studies in concert with my NATO allies to look at it. In addition, I am proceeding, even without the architectural studies to work on PAC-1 and PAC-2, in order to give me some self-defense capability within a geographical footprint that the Patriot has on the battlefield. It does not solve the total problem, but we are trying to get at it. To answer your question, I do not have all the answers yet.

Senator QUAYLE. You feel that this new ATM office that you are giving some coordination and that this problem is being resolved.

General THURMAN. The problem is being worked hard. We have got a special task force to do it. It is commanded by a colonel who is on the brigadier general's list. He has been to NATO just in the last 2 weeks. We have full energy working. Meanwhile, we have some work going on in R&D.

Senator QUAYLE. Mr. Chairman, this might be of interest to the subcommittee. This whole area we got into a little bit last year. We might at some future time——

General THURMAN. We would be happy to come and lay it down.

Senator QUAYLE. Just to see where we are, it is sort of new and it is getting off the ground.

General THURMAN. We would welcome that.

Senator QUAYLE. What we are talking about in the ATM and looking at the defensive capability, would some of these be candidates for the CDI account?

General THURMAN. Absolutely.

Senator QUAYLE. That is where you might look for some of the potential funding, would be in the conventional defense initiative?

General THURMAN. After we get through the R&D phase and the architectural studies, yes. If the CDI account came next year or the year after that then, yes, it may be.

General WAGNER. There is some payoff on some of the things thay are doing in SDI, and you know there are strictures on using CDI for SDI. So where we would use it would be on these things like we are doing in Patriot, and so forth.

So we have to depend on them to do some of the other missile work, and we are in synch with them very closely.

Senator **Quayle**. Clearly we are looking at conventional defenses.

General **Thurman**. Absolutely.

Senator **Quayle**. I think that is what Senator Nunn and Senator Cohen from this committee and Congress went along with, said let us look and see what we can do in some of the defensive capability on a conventional basis. One of the problems that we are working through right now is the extended air defense and particularly looking at some of the ballistic missile defense, because if you look at a conflict scenario, those are going to be the first ones to go. Everybody knows that and they are going to go right after our targets.

I know this is a new issue, but it is something that this committee—it was the Strategic Committee and this is conventional we were talking about, but the Strategic Committee last year looked into it and I hope we can follow through this year on that.

General **Wagner**. This is a very high priority, as you know, in the Department of Defense now, and they are trying to open up a better dialogue with our European allies and so forth, to make sure that they understand the same degree of the threat that we do. That has been the problem.

Senator **Quayle**. I think that is very critical. Obviously if you do not have a consensus on what the threat really is, what are you going to do as far as getting any kind of cooperation to getting a development for systems to meet that threat?

General **Thurman**. That is one reason why we went out with the architects, to go out to get collaborative efforts from those countries abroad.

MODERNIZING TACTICAL NUCLEAR WEAPONS

Senator **Quayle**. General Thurman, would you comment briefly on the need to modernize our tactical nuclear weapons and the need for the new 155 millimeter rounds?

General **Thurman**. We believe and have represented the fact that we should proceed with modernization of both the 155 mm and the 8-inch.

General **Wagner**. We also have to have a Lance follow-on sometime because we can't keep going indefinitely.

General **Thurman**. The Lance, with a relatively modest range, is one we are not moving as rapidly to modernize. We have some studies ongoing.

Senator **Quayle**. What are we not moving as rapidly to modify?

THE LANCE

General **Thurman**. The Lance. Finally, you have the one that I indicated to you before, which is if the agreements take place, then the builddown of P–II to P–1B, where you have a missile range more in the order of 700 kilometers.

Senator **Quayle**. You have mentioned that builddown from P–II to P–1B a couple of times today. Is this what we are going to do?

General **Wagner**. If we had to cut the range back, we could just take off the record stage.

Senator **Quayle**. I know. I know the technical situation. I am wondering about the political.

General **Thurman**. I think that is one of the issues.

Senator **Quayle**. It is almost as a given, and I will tell you it is a long way from being a given, I will guarantee you that. I was over there a few weeks ago and I have talked to a number of people about that. Quite frankly, I think that is one of the options we ought to seriously explore.

But we have got some political problems before we get down to that P-1B. I think that that is really, just looking at what may be the end result of those negotiations, that that may be the course of action. You said that a couple of times, as if it is going to happen. I thought maybe you had some information I do not have.

General **Thurman**. No. I understand that it is an issue. It is clearly an issue.

ATACM

Senator **Quayle**. What about making the ATACM's dual capable?

General **Thurman**. We have some restrictive language at the moment that says, do not look at that. So if you want to open that up you will have to help us.

Senator **Quayle**. What is your recommendation to the Congress? Would you like the capability to go dual capable?

General **Thurman**. It offers the following advantage in that we have a built-in ground support equipment system extant; we have the built-in manpower extant. So, it has a robust capability to put that on board. I think it is one we clearly ought to look at.

Senator **Quayle**. So you would like to have that restrictive language removed?

General **Thurman**. It would be helpful to us if it were.

Senator **Quayle**. Would there be any disadvantages to removing that restrictive language?

General **Thurman**. Not that I am able to ascertain, although wiser heads may prevail.

Senator **Quayle**. But from your viewpoint?

General **Thurman**. From my perspective that is something you ought to look at. Whether you adopt it or not is something different.

Senator **Quayle**. But you would recommend that we would do away with the restrictive language?

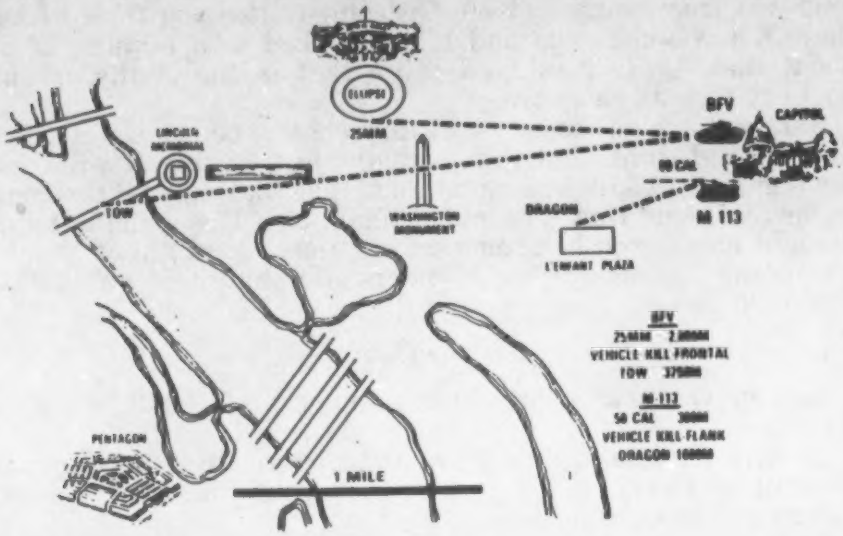
General **Thurman**. Yes.

General **Wagner**. We would not want to change the priority on that program from conventional to nuclear. We want that number over and above the conventional number that we need. But it is cheaper and the sooner you do it, the better it is because we fully designed it. It is going to be very expensive to go back and then design to put in a front end.

GAO REPORT ON BRADLEY VEHICLE

Senator **Quayle**. Could you comment on the GAO report we have got on the Bradley vehicle, a comparison to the M-113A3 armored personnel carrier?

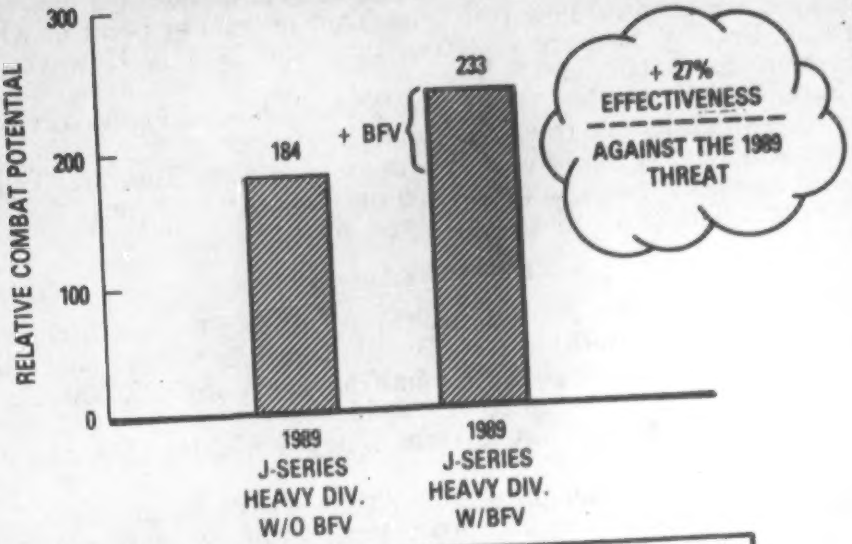
MAXIMUM EFFECTIVE RANGES
M-113 — BFV


ELLIPSE
LINCOLN MEMORIAL
25MM
TOW
WASHINGTON MONUMENT
BFV
CAPITOL
50 CAL
DRAGON
M 113
L'ENFANT PLAZA
BFV
25MM 2,000M
VEHICLE KILL FRONTAL
TOW 3750M
M-113
50 CAL 300M
VEHICLE KILL FLANK
DRAGON 1000M
PENTAGON
1 MILE

General THURMAN. Sure. I would be happy to. The comparison I think is sophomoric. The reason I say that is because it does not take into consideration the totality of the weapons system. I would simply point out to you that the M-113 is an armored personnel carrier that is equipped with a 50 caliber machine gun that will go out to 1,100 meters. The Bradley fighting vehicle is equipped with a TOW, which will reach out 3,750 meters.

The difference in all of this is that the Bradley Fighting Vehicle will kill targets 3,750 meters away, and this M-113 will not. It will only kill targets and some, only some, very light armored ones at 300 meters. So when you are looking at cross-country mobility, the Bradley has the capability of having armor placed on it and not damaging its cross-country mobility.

EFFECT OF FIELDING CURRENT BRADLEY IN A HEAVY U.S. DIVISION



. . . AND WITH SURVIVABILITY ENHANCEMENTS . . . EVEN MORE!

The M-113, if you hung reactive armor on it and the like, would further reduce its cross-country mobility in the comparative analysis that is alluded to in the GAO report. In the end game, a division equipped with Bradley Fighting Vehicles is about 37 percent more effective than the same division equipped with the M-113's simply because you get to kill the other guy before he kills you. It is just that simple.

Senator QUAYLE. Do you take issue then with some of the findings of the GAO?

General THURMAN. I have not read it in detail, but I take issue with the notion that they are equal vehicles. They are nowhere near equal.

Senator QUAYLE. I wonder if you might take a look at it.

General WAGNER. I have read it.

Senator QUAYLE. What do you think about it?

General WAGNER. It considers one aspect of battle, and that is mobility only and it does not even consider total cross-county mobility where you survive on the battlefield. If I could always move down smooth roads to dash from A to B, that tiny portion of survivability would be about the same.

But that is only one piece of it, how you move there. You go cross-county, and then while you are going you fire on the move with your gyro-stabilized gun that you have in the Bradley. You can not do that in the M-113A3 that they are talking about. So they are just taking one very narrow view of the major problem of how you fight on the battlefield.

Senator **Quayle**. So how would you characterize it?

General **Wagner**. I characterize it as about one-third of a study that did not get into how you fight. That is the key point at whether the Bradley is more effective than the M-113. How you use them on that battlefield.

Senator **Quayle**. Mr. Chairman, I think I have about completed my questions. Thank you very much.

Senator **Levin**. OK. Just a few more questions from me. Talking about studies. I think you owe us a master plan for trucks.

General **Thurman**. For trucks, yes, sir.

U.S. ARMY TRUCKS

Senator **Levin**. We read an article in Defense Week a little while ago which says something like, Bangladesh has better trucks than the U.S. Army, in alleging that half of the Army's 60,000 2½ ton trucks are between 18 and 23 years old.

General **Thurman**. That is right. They are older than the drivers.

Senator **Levin**. I was going to say that. There we go again, huh?

General **Wagner**. The last procurement was 13 years ago on 2½ ton trucks. We have a program this year to get into this decade on technology. It is a very small RDTE program. We want to buy off-the-shelf, we are not going to design our own truck like we have done in the past. We think that we need to get that program going to replace those 2½——

Senator **Levin**. Why have we not moved faster?

General **Wagner**. Sir, we had the dollars in the budget last year and they were taken out.

Senator **Levin**. So it is money?

General **Wagner**. Yes, sir.

Senator **Levin**. I asked you, General, before about the language in the Appropriations bill last year relative to the DIVAD follow-on. You said that was not the Army's preference, that that was the Congress' requirement.

General **Thurman**. Yes, sir.

Senator **Levin**. And indicated that if that requirement were not there, that you would pursue your original acquisition strategy on that. How many more months would you need to follow your acquisition strategy beyond the July 1 deadline that the Congress has imposed on you?

General **Thurman**. I think about six.

Senator **Levin**. Thank you. General Thurman, you refer on page 8 of your recent testimony to an Army addendum to the Army's 5-year program submission. Would you supply the most recent addendum for the record?

General **Thurman**. That is the Program Objective Memoranda addendum. The Five-Year Defense Plan Addendum.

Senator **Levin**. The conventional defense enhancement?

General **Thurman**. It is the POM addendum, which contains much of that.

Senator **Levin**. Yes, will you submit that for the record?

General THURMAN. That is a Department of Defense document, and I will have to take that requirement back to the Department of Defense.

Senator LEVIN. Would you have any problem in submitting it to the record, if they do not?

General THURMAN. I do not have any problem with it if they do not.

Senator LEVIN. Would you recommend that they do?

General THURMAN. It is classified.

Senator LEVIN. Well, we will keep it classified.

General THURMAN. Well, I understand that. That is in the best interest of the Department of Defense and I will carry the message back, sir.

Senator LEVIN. Can you recommend that they do it?

General THURMAN. I will ask them if they will.

Senator LEVIN. Do you have a problem with recommending that they do?

General THURMAN. I do not, sir.

Senator LEVIN. A question has been asked about the general need to improve our conventional defense in light of some arms control developments, which are apparently occurring. Do those developments, if they succeed, increase the need to conventional strength in Europe?

General THURMAN. We believe that they require an increase in conventional capability. When you say strength, that may allude to additional forces, but I think in capability I think the answer is, yes. I think that the technological innovations which lie ahead give you the opportunity to raise the nuclear threshhold by some substantial margin, if we are able to invest in that with some degree of rapidity and volume.

Senator LEVIN. Would it also improve our conventional capability, which we believe may be necessary, indeed is already necessary for other purposes? Would it improve that conventional capability if we did not prematurely terminate procurement before meeting our modernization needs and requirements?

General THURMAN. We will improve our capabilities if we maintain a high modernization rate. No doubt about it.

Senator LEVIN. If we also modernize a greater percentage of our forces than were showed on those graphs?

General THURMAN. You will increase the warfighting capabilities of the extant force by a substantial margin.

Senator LEVIN. I take it you would very much like to see that, if we could do it?

General THURMAN. It depends upon if we have the money, we would do it. I would like to make one other comment about that. We always have to maintain an aggressive R&D program because one thing that comes across in here is the stewardship of the Secretary, the Chief or my small part in it. You always have to leave the R&D base in good shape for people who will follow 10 years later.

Senator LEVIN. But would you say an aggressive R&D program is one that is smaller than the SDI program?

General THURMAN. I would say that is not aggressive. But it is what I can afford.

Senator LEVIN. It is what you are given.

General **Thurman**. Well, it is what I can afford inside what I was given.

Senator **Levin**. Were there not also certain directions as to what percentage of that program would be devoted to SDI?

General **Thurman**. No, sir.

Senator **Levin**. You say the Army has been allocated a certain percentage of the SDI budget. Is that your allocation?

General **Thurman**. No, no. That is given to us by the Department of Defense.

Senator **Levin**. That is what I meant. That is all that I meant.

General **Thurman**. In 1987, for example, I have got 34 percent of the SDI funding allocation, which is $1 billion even. In 1988 it goes up to a little bit above that.

THE HEART OF R&D --- TACTICAL PROGRAMS

($ MILLIONS)

TACTICAL PROGRAMS

FY87	FY88	FY89
2051	2882	3264

	FY87	FY88	FY89
AIRCRAFT	140	460	664
AIR DEFENSE	90	147	185
ARMOR	126	158	139
SPECIAL OPERATIONS FORCES	43	115	52
COMMO	159	228	263
MISSILES	209	276	302

THE FUTURE THRUSTS

- ANTI-ARMOR WEAPONS
- ARMORED FAMILY OF VEHICLES
- FORWARD AREA AIR DEFENSE
- TACTICAL MISSILES
- JOINT STARS
- JOINT TACTICAL FUSION
- COMMAND & CONTROL
- ADVANCED MUNITIONS
- ADVANCED HELICOPTERS

Senator **Levin**. I also noticed that in terms of armor, that your R&D is actually going to decline from 1988 to 1989. I cannot quite find that chart, but my memory is that on the armored portion of your R&D budget, that it actually goes up a little bit, your requesting, and then goes down. It goes up from 1987 to 1988, and then goes down from 1988 to 1989, whereas aircraft goes up from 1988 to 1989, air defense goes up.

General **Wagner**. That is the drop, sir, when we went down to 600 on the tanks and on the Bradley Fighting Vehicles and some of those others.

General **Thurman**. No, he is talking about R&D.

General **Wagner**. That is all included in that, as far as the dollars.

General **Thurman**. All I would suggest to you is, this gets to Senator Glenn's comment of what is the totality. So on the armored side, the R&D is going down, but on the anti-armor associated with missiles and the like, that is going up.

General WAGNER. I was talking about procurement, sir, not R&D. I am sorry. I misunderstood the question.

General THURMAN. The answer is yes, it is going down. We are beginning a prototype, proof of principle work on the new Armored Family of Vehicles. What would then be seen is for the Armored Family of Vehicles itself, it would then jump up the next year.

General WAGNER. That is just a start. In 1988 proof of principle, about $10 million. Then it goes up to $45 million in 1989. Then it starts moving up in 1990. We are still working on the numbers that that program would involve.

General THURMAN. So 1990 is when this takes off into the Armored Family of Vehicles in big numbers.

Senator LEVIN. If there were more money available in 1988 and 1989, could you use it in that account?

General THURMAN. Absolutely, because we can go to prototype building, as opposed to computer building.

General WAGNER. We can also use it in some programs in improving our M-1.

Senator LEVIN. Do you know whether the request was greater in that account than was able to be granted?

General THURMAN. No.

Senator LEVIN. Internally?

General THURMAN. No. We took that down.

General WAGNER. There is a lot of money that does not show up there that is in the technology base in test beds and so forth, where we are testing the technology that will go into the Armored Family of Vehicles. A lot of major work is going on in the technology base.

Senator LEVIN. Let us assume we decided that our priorities, within whatever budget number the Congress adopts, are somewhat different than the DOD's, and we find some additional money we want to put into conventional and less in nuclear. Just for the moment. Or we wanted to slow down the Midgetman, or had doubts about the MX. Whatever the reason is, we had different priorities, assume for the moment. I do not know that that is an accurate assumption at all.

Would you tend to put any additional money that we could put into Army conventional capability into the modernization or into the procurement of those five systems or other systems, or would you put it into that R&D account?

General THURMAN. The split would be 85-15 in favor of procurement, not just in these five numbers. You want to put some modest amount in the R&D to try to back it up so that you get there faster, but in the main it would be for procurement of the extant systems that are available and to take care of the Guard and Reserve requirements for the ancillary items of equipment in order to help them out.

Senator LEVIN. When you say procurement, would you say in general that you are talking about procuring a greater number, modernizing a greater percentage of the force ultimately, or procuring faster, at faster rates?

General **THURMAN**. You would procure at faster rates, which would then modernize the forces faster given the funded delivery period of 2 years down range.

Senator **LEVIN**. So between the overall percentage ultimately modernized and between getting there faster, you would go with the rate being faster rather than the ultimate number being higher?

Is my question clear? In other words, if you have a choice between a more efficient production rate and ultimately having fewer or more systems, which would you pick?

General **THURMAN**. Probably the latter, more systems, because more systems on the firing line give you the warfighting outcome that you are talking about in terms of fighting the battles wherever they may be.

Senator **LEVIN**. So the priorities would be, if we found "more money" for the conventional forces army, your priorities would be in this order, basically more procurement in terms of the ultimate percentage of the forces modernized. Second, would be a faster production rate. Third would be that R&D.

General **THURMAN**. That is a good fit.

General **WAGNER**. The R&D would be a small part. We do have some shortfalls we would take care of.

Senator **LEVIN**. Thank you both very much. We will have some additional questions for the record, so we will keep the record open 24 hours. We have asked you for some additional information, and we would appreciate that.

General **THURMAN**. Thank you very much. We appreciate coming before you.

[Questions for the hearing record, with answers supplied, follow:]

QUESTION SUBMITTED BY SENATOR CARL LEVIN

M1 PRODUCTION BASE

Senator **LEVIN**. General Thurman, what is the Army's plan for maintaining a production base for the M1 tank? Has the Army decided to shut down either of the two tank plants?

General **THURMAN**. The Army has made no final decision on closing either tank plant. We are currently undertaking an economic analysis to determine an appropriate course of action to be taken during the 1990's as Abrams tank production decreases and the Army's follow-on combat vehicle procurement program—the Armored Family of Vehicles—begins production.

QUESTIONS SUBMITTED BY SENATOR STROM THURMOND

OBSOLESCENCE EQUIPMENT

Senator **THURMOND**. General Thurman, in looking through the charts you have provided, I see that the Army does not plan to acquire enough of major systems to meet numerical requirements. How can the Army meet the requirements of the future battlefield when a large portion of its equipment is reaching obsolescence?

General **THURMAN**. The requirements of the future battlefield are driven by the projected Soviet threat. Based upon the projected threat, R&D must begin sufficiently early to enable us to field equipment or improvements to existing equipment capable of meeting the threat before current equipment becomes obsolete. The Armored Family of Vehicles and LHX are two examples of programs which are designed to do this. Fiscal constraints do not permit us to buy the total requirement for major systems and this, coupled with technological improvements and changes in the threat, results in the high-low mix which I mentioned earlier.

APACHE HELICOPTER/GAS

Senator **Thurmond**. General Thurman, the Apache helicopter is the only close air support weapon platform in production today that is fully capable of day, night, and adverse wheather operations. It seems to me that this would be a very important weapon for the Army, yet the Army may only procure about 50 percent of its requirement. What close air support system in production today is available to the Army to meet the night and adverse weather conditions that are prevalent in Europe?

General **Thurman**. The AH-64 Apache is the only available aircraft in production today that fully meets Army all weather day/night capabilities for attack helicopter operations. To offset the procurement of only 50 percent of the AH-64 requirement, the AH-1 Cobra will remain in units that require but cannot be resourced with the AH-64. The AH-1 is a lower technology attack helicopter that does not possess the adverse weather or full night engagement capabilities of the Apache. However, the AH-1 is equipped with TOW missiles and 20mm cannon and provides tactical commanders a creditable day and limited night attack helicopter capability. Close air support provided by the Air Force further augments Army capabilities.

CS/CSS—SUSTAINED OPERATIONS

Senator **Thurmond**. General Thurman, last year I met with General Rogers in Europe and he expressed concern about the lack of adequate combat support and combat service support units necessary to conduct sustained combat operations. What does the creation of numerous light divisions do to alleviate this problem?

General **Thurman**. In the 1985 Defense Resources Board (DRB) General Rogers raised the issue of the M+10 CS/CSS shortfall and DEPSECDEF directed the Army study the problem. Army study identified three shortfall areas of concern: personnel, equipment and deployment. In that six month study it was determined that 97 percent of the personnel shortfall could be filled in the event of war, $448M was programmed to purchase ERC A equipment for the M+10 units and by EUCOM estimation deployment time could be accelerated by one third. Since that study Army has continued efforts to improve Europe based and Europe oriented Echelons Above Division (EAD) CS/CSS forces as well as EAD CS/CSS support to all other theaters. Efforts include a task force to study and resolve problems with individual skill qualification in the reserve component, an increase of 1730 CS/CSS spaces in EAD CS/CSS units forward stationed in Europe, a concepts analysis agency study which determined that deployment time would be accelerated by two thirds as POMCUS is filled to 96 percent in 1994, and the Army's previous $448M programmed investment was almost doubled to $849M.

[Whereupon, at 11:31 a.m., the subcommittee was adjourned, to reconvene upon the call of the Chair.]

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DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEARS 1988 AND 1989

MONDAY, MARCH 9, 1987

U.S. SENATE,
SUBCOMMITTEE ON DEFENSE INDUSTRY AND TECHNOLOGY,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

VITALITY OF THE DEFENSE TECHNOLOGY BASE

The subcommittee met in open session, pursuant to notice at 2:30 p.m., in room SR-232A, Russell Senate Office Building, Senator Jeff Bingaman, presiding.

Present: Senators Bingaman, Dixon, Wirth, Warner, and Gramm.

Staff present: Jonathan L. Etherton, Daniel J. Wildfong, Gerald K. Bankus, professional staff members; Kathleen L. McGuire, staff assistant.

Also present: Edward M. McGaffigan, Jr., assistant to Senator Bingaman; Charles C. Smith, assistant to Senator Dixon; James R. Sayer, assistant to Senator Wirth; Alan Ptak, assistant to Senator Gramm; Samuel Routson, assistant to Senator Symms; and William J. Wight, assistant to Senator Warner.

OPENING STATEMENT BY SENATOR JEFF BINGAMAN

Senator BINGAMAN. Why don't we go ahead and start the hearing.

Let me make a statement here, since this is the first subcommittee hearing. We are hearing testimony today on the Nation's technology base, with a particular focus on the defense aspects of that.

We have four distinguished individuals here to testify. Dr. Bill Graham, Mr. Eric Bloch, Dr. Frank Press and Dr. Ron Kerber, who are clearly in the key positions to give us a broad view of the health and vitality of the technology base, which is obviously an area of critical importance to the long term ability of this country to provide for an adequate national defense.

This subcommittee was formed this year to focus on defense resources and policies with the overall goal of finding ways to ensure U.S. technological superiority over potential adversaries.

Responsibilities of the subcommittee include, among other things, the defense industrial base; the defense technology base; oversight of certain defense laboratories; and defense acquisition policy.

This is the first of a series of hearings that will take a long-term view of the technology and industrial base issues, with the ultimate objective of defining how the United States can best use its technological and industrial strength to advance national defense goals.

The focus today is on the underpinnings of national defense, that is, the technology base. We draw on this technology base to provide us the qualitative superiority in our weapons systems needed to match the numerical superiority of our principal military adversary, the Soviet Union.

The evidence suggests that for several years now DOD has neglected its long term research needs, and has been unwilling to bear its fair share of the burden in maintaining in the United States a world class R&D infrastructure.

The last time the Department of Defense dominated Federal research and development spending, to the extent that it does today was from World War II through the start of the Vietnam war.

The Department then devoted 20 to 25 percent of its overall research and development expenditures to the technology base.

That percentage has been eroding ever since. Over the past 6 years, the technology base has slipped from 15 percent to 9 percent of Defense research spending, and it is proposed to fall below 8 percent in the fiscal years 1988 and 1989 request before the Congress.

According to this year's Joint Chiefs of Staff posture statement, while we maintain an overall advantage over the Soviets in the 20 most important basic technology areas, the trends are against us in 9 of the 20 areas.

We have also had a series of reports in recent years about the problems with our technology base. The National Academy of Sciences reports have pointed to problems in such fields as mathematics and physics.

The White House Science Council's Packard-Bromley report of last year pointed to serious problems facing our university laboratories.

And other reports, such as the 1983 White House Science Council panel chaired by David Packard have been critical of some of our Federal laboratories, especially the in-house DOD laboratories.

All of this leads me to conclude that this subcommittee must seek to ensure that we're not sacrificing our future defense capability through neglect of our investment in our technology base.

One other topic we'll begin to explore today is the transfer of technology from defense to the civilian sector. We need to be sure that the ideas that are developed in the defense laboratories, whether in universities, industry, or the Federal sector, work to the maximum extent possible for the benefit of the entire economy.

Without the maximum possible technological transfer from the defense sector to the civilian sector, we face the risk of falling behind our allies in economic terms.

Today, Dr. Graham, Mr. Bloch, Dr. Press and Dr. Kerber will share their views on these and other matters.

Dr. Graham became the science adviser to the President and the Director of the Office of Science & Technology Policy this past October.

Before assuming the duties of science adviser, Dr. Graham was deputy administrator of NASA. And I'm also pleased to note that

Dr. Graham served 3 years at the Air Force weapons lab in Albuquerque.

Dr. Press is the President of the National Academy of Sciences; has previously served on President Kennedy's Science Advisory Committee; and was science adviser to President Carter.

Before becoming a scientific administrator, he had a long and distinguished career as a geophysicist at MIT. You might be interested to learn Mt. Press—this is new information to me—Mt. Press in Antarctica is named for our witness today.

Mr. Bloch is the Director of the National Science Foundation and is charged with responsibility for strengthening the national scientific research potential with improving science and engineering education at all levels, and with increasing the interchange of scientific information among scientists in the United States and abroad.

Before his present position, he was a vice president of IBM, and served as chairman of the Semiconductor Research Corp.

Dr. Kerber came to his position as Deputy Under Secretary of Defense for Research and Advanced Technology from Michigan State, where he was Associate Dean for Graduate Studies and Research, and Director of the Division of Engineering Research.

I'm certain the testimony we're going to receive will significantly broaden our understanding of this country's technology base.

It is vital that as we begin this first session of the 100th Congress, we have an understanding of this complex issue.

Before we go to any testimony, I'll defer to Senator Gramm, who may have an opening statement as well.

Senator **Gramm**. Well, thank you, Mr. Chairman. I'll put my opening statement in the record.

PREPARED STATEMENT BY SENATOR PHIL GRAMN

Mr. Chairman, I would like to take this opportunity to commend you for assembling these witnesses to discuss general trends in the defense technology base. This area has been neglected for many years by this committee and this subcommittee will provide an excellent forum for the review of this issue in a broad context. I look forward to the other hearings in this series.

There are several issues that we need to address as we examine trends in the defense technology base. Are we managing these funds in the most effective manner by targeting them to the areas and institutions that will give us the greatest return? Can the Department of Defense do a better job tapping the tremendous potential for innovation of successful companies in the private sector? Do we have the proper balance between the efforts expended in basic and advanced research and those expended in the full-scale development phase of specific systems? How can we more effectively apply DOD research funds to ensure the long-term of health of the technology base?

These are some of the issues I intend to explore today and in the weeks ahead. I am hopeful that our subcommittee can play an active and constructive oversight role.

Senator **Gramm**. I'm happy to have an opportunity to serve as ranking member of the Defense Industry and Technology Subcommittee.

We all know how important technology is in keeping Ivan back from the gate, and keeping the world free. We also know how important it is to develop that technology and to bring it on line in the defense industry with a goal toward using our resources efficiently, both to meet the defense needs of the Nation, and also to meet the budget constraints that we all face.

I look forward to working with you, Mr. Chairman, in trying to see that we develop the industrial base of the Nation; that we promote the development of technology; and that we do it all in such a way that the taxpayer can afford it.

I want to join you in welcoming our first witnesses here, and I look forward to hearing what they have to say.

Senator **BINGAMAN**. Let me just, before we go to the testimony, ask if either of the other Senators here have opening statements; Senator Wirth?

Senator **WIRTH**. No, thank you, Mr. Chairman.

Senator **BINGAMAN**. Senator Warner?

Senator **WARNER**. Mr. Chairman, I just wish to commend you for taking the charter that I joined Senator Nunn on for focusing in one subcommittee the responsibility for meeting this challenge.

To judge by the witnesses and the audience here today, there's a great deal of interest in the subject.

Senator **BINGAMAN**. Thank you very much.

Why don't we ask the witnesses each to make their statement in whatever form they would like. Then we will ask questions of the whole panel.

Let's take them in order, Dr. Graham, Mr. Bloch, Dr. Press and Dr. Kerber.

Dr. Graham, why don't you go right ahead?

STATEMENT OF DR. WILLIAM R. GRAHAM, DIRECTOR, OFFICE OF SCIENCE AND TECHNOLOGY POLICY

Dr. **GRAHAM**. Thank you, Mr. Chairman, distinguished members of the subcommittee.

I'm pleased to appear before you today to present my views on the Nation's defense technology, a subject vital to the interest of us all, as you have so aptly described it in your remarks.

The United States national security and military posture depend on the ability of our industrial base, sometimes called the arsenal of our democracy, to provide the equipment needed by combat systems and by support systems.

The spectrum of technologies encompassed by these needs is immense. It ranges from automated maintenance of Army field equipment to the most sophisticated sensors involved in space-based surveillance, with just about all the imaginable technical universe carried between these boundaries.

It is a large range indeed.

Defense technologies also call on basic sciences, such as those involved in the production of special materials, as well as on the manufacturing techniques and process control at the other extreme of application-oriented technologies.

Still another dimension is offered by the increased emphasis on biotechnology, both from the viewpoint of protective applications and from that of providing for the health and safety of our military personnel.

Up to the early decades of this century, defense technologies were largely limited to those available from the civil sector, although some interesting examples could be cited where defense requirements stimulated technology or technical developments.

These examples certainly include the gyrocompass originally used for ship navigation, and the very early wireless communications, which were used by the U.S. and allied armed forces.

Since World War II the role of technology has radically changed. The advent of jet aircraft, long-range guided missiles, radars, lasers, space-based sensors, digital communications, and many other aspects, have changed the art of land, sea and air warfare, where available and potential technologies can profoundly influence the central new aspects of military concepts, doctrines and strategies.

The Strategic Defense Initiative is an excellent illustration of this point.

With the enormously increased impact of technology, the role of the defense industries has also changed. They have had to invest in facilities, equipment, and professional skills that are specifically focused on defense needs.

In fact, they've had to invest in advanced technical research, and even in some basic research, to make sure that the military has the best available state-of-the-art at hand, and that the scientific and technological aspects of the potential threat are properly assessed.

And I emphasize here that the U.S. approach to national security has not been to develop overwhelming mass and replication of forces, but rather, to invest in our high technology and to try to minimize the size of our military deployments in deference to maximizing their total capability by drawing upon our technological preeminence to give them that capability against mass, the mass that the Soviets in particular have deployed by replicating copy after copy of tank and aircraft and ship.

To remain profitable, the defense industries have had to rely on a reasonably stable stream of defense orders, together with the equitable arrangements for overhead reimbursements and consideration for independent research and development, IR&D.

When the Nation's interest in military strength is paramount, and the economic circumstances allow, the defense industries can provide for much of the required R&D investments.

When budget trends are adverse, our defense industries, even with the strong support of the Department of Defense, can no longer keep up with the rapid pace of technological change.

It is then that the Government laboratories, aided by university participation, must provide technical leadership and continuity.

This is precisely the situation in which we find ourselves now, and in which we appear likely to remain for some time.

The Department of Defense, together with all other agencies interested in science and technology, including the Office of Science and Technology Policy, must be alert to this problem, and must see to it that the Government in-house technical capabilities primarily represented by the national laboratories, be focused on those areas of technology that have the highest possible leverage on our national security and on our national defense needs.

This must hold for not only what we can see today, but must also provide for 20 to 25 years in our future.

We must find ways to enlist the best and the most dedicated university scientists in this endeavor.

Industry must be encouraged to spend its independent research and development funds on endeavors that will truly improve and advance the state of the art in technology, rather than on routine competitions, or on maintaining large capability pools with mundane engineering activities described as research.

The Government cannot assume the whole burden for maintaining and enhancing the Nation's defense technology posture, even so. Industry must, under fluctuating but often stringent budget constraints, look to sources of funding other than the overhead generated by defense business alone.

This is one reason why private enterprises, engaged in defense business, must have the motivation and the opportunity to apply some of their advanced technologies to programs aimed at the private sector.

The Government has steadfastly supported commercial opportunities for defense contractors. Recent efforts to facilitate private investment in commercially oriented diversification and increased competitiveness are expected to further strengthen the industrial R&D base.

The commercial aircraft industry is an outstandingly successful example. Many of the aircraft developments starting in the 1930s could be traced to Government efforts.

The major purpose and effect of the National Advisory Commission on Aeronautics was to create advanced technology that would lead to primacy in aeronautics and air transportation.

Ever since, the U.S. aircraft industry has been a world leader, and at the same time, supplied several commercial derivative aircraft to the military service.

A byproduct, of course, is the major positive contribution that that industry has made and is making to the U.S. balance of trade.

Even today, and for some time to come, the symbiosis between the military and civil aircraft development will continue. The National Aerospace Plane program is another important illustration.

The technical advances, the design concepts, the laboratory experiments involving hypersonic ramjets as well as advanced computational techniques and advanced materials, are fully supported by Government research.

Technology maturation and the construction of a flight demonstrator, should it prove warranted, will be financed by the Government. It is expected that the National Aerospace Plane will, in addition to contributing to our military aircraft and space-related missions, result in a number of interesting commercial applications.

At that point, we in the Government would certainly expect to see private investment in the development of prototypes for commercial applications.

The Orient Express, spanning the Pacific Ocean, is a possible example of this commercial potential.

To sum it up to this point: Defense technology is becoming so large and so complex that neither the military nor the civil sector alone can support the necessary advances at the required rate of progress necessary to maintain our technological preeminence and allow us to rely on that rather than mass.

Synergy and cooperation between the two sectors are the prevailing imperatives. Once the Nation's full technology capabilities are brought to bear on the national security requirements, the needs and opportunities can be anticipated and the corresponding research efforts undertaken.

Spinoffs to the civil sector, forthcoming from defense programs, should strengthen industry so that it can contribute to the military needs more effectively than if the two sectors were kept strictly separate.

Let me now address some of the deficiencies.

First, there is insufficient incentive for industry to conduct basic research. It can be quite expensive, and payoff in terms of military applications, or in terms of industrial profitability, is generally a decade or more away. It's a long term proposition.

The remedy, I suggest, is that the Government systematically increase 6.1 type programs, both in its in-house research and in the independent R&D programs that are financed by overhead accounts on Government procurements.

As the President referred in his State of the Union and associated material, we also look to stabilizing the investment tax credit in R&D—let me say that correctly, stabilize the R&D tax credit.

The Government laboratories responsible for 6.1 type programs should have a specific say on the nature and direction of basic research programs conducted by industry with the proper protective measures in respect to proprietary data.

University experts and Government laboratory personnel should consult with industry's leading scientists to define the direction and the priorities of basic research.

The Office of Science and Technology Policy attempts to encourage this process through its relationships with the White House Science Council, the National Academy of Sciences, the National Science Foundation, of course the Department of Defense, and other groups involving industry participation.

A second major problem, especially in the presence of limited resources, is how to prioritize and share efforts in advanced and exploratory research; that is, what must be done when the broad objectives in a given area of endeavor are clearly understood, and several confluent technical disciplines must be advanced simultaneously.

The factors that are brought to bear on this aspect of a government program are, first, the state of a particular technology area; second, the effectiveness of the competing approaches; third, the leverage of technology on the overall system performance; and fourth, the availability and readiness of competent technical teams.

The industrial sector would certainly add arguments about competitive potential, market strategies, and profitability, considerations that are not directly related to the Government.

An illustration of the problems encountered under this heading is the current situation in the semiconductor industry. There are indications that the industry may be threatened with loss of its international competitiveness, at least in some sectors of that industry.

Since the Department of Defense is one of the major consumers of high performance microcircuitry, the problem has clear national security implications.

The Defense Science Board and the National Science Foundation have jointly concluded that advanced semiconductors are critical to systems associated with the needs of national security.

Both private industry, under the aegis of the Semiconductor Industry Association, and the Defense Science Board have discussed approaches to recover the worldwide competitiveness of the U.S. industry vis-a-vis foreign manufacturers.

OSTP, with the support of the White House Science Council, will examine the basic causes of the present situation, investigate alternatives to Government subsidies, and recommend appropriate measures of technological development and investment programs to address the problem.

The last problem I wish to address is the transfer of Government-generated R&D to the civil sector. There are specifically designed and designated programs within NASA, for instance, which have, for basic purposes, the transfer of advanced technology to commercial applications.

In some other cases, transfer occurs as a matter of course in large aerospace companies when they exchange people and activities between their governmental and commercial market divisions.

Government laboratories often have in-house programs, presentation to industry type sessions, where the achievements of specific laboratory activities are brought to private sector attention.

Other presentations are followed by negotiations for competitive or sole-source follow up.

But at any rate, the technology, within the limitation of security classifications and proprietary limitations, is attempted to be transferred; and in many cases, is being transferred.

Other programs are aimed at relatively small business corporations. And much of this is embodied in the Technical Transfer Act of 1986, which makes specific provision for the transfer of Government generated and national laboratory generated technologies into the private sector, and encourages the laboratory directors and their agencies to conduct this type of transfer.

Still, we've not done all we can do in this area. The President's competitiveness initiative, submitted to Congress in January, contains provisions to address specifically this issue.

I believe that we must all work together to do better at facilitating technical transfer to the civil sector, just as I mentioned earlier the importance of transferring civil technology to our national security.

Mr. Chairman, I thank you and the members of the subcommittee. And I'll be pleased to take your questions after my colleagues have made their statements.

[The prepared statement of Dr. Graham follows:]

PREPARED STATEMENT OF DR. WILLIAM R. GRAHAM

Mr. Chairman, Distinguished Members of the Subcommittee:

I am pleased to appear before you to present my views on the nation's defense technology base, a subject of vital interest to all of us.

The United States national security and military posture depend on the ability of our industrial base—the arsenal of democracy—to provide the equipment needed by our combat systems and our support systems. The spectrum of technologies encompassed by these needs is immense; it ranges from automated maintenance of Army field equipment to the most sophisticated sensors involved in space-based surveillance, with just about all the imaginable technical universe in between.

Defense technologies also call upon basic sciences, such as those involved in the production of special materials, as well as on manufacturing techniques and process control at the other extreme of application-oriented technologies. Still another dimension is offered by the increased emphasis on biotechnology, both from the viewpoint of protective applications and from that of providing for the health and safety of military personnel.

Up to the early decades of this century, defense technologies were mostly limited to those available from the civil sector, although some interesting examples could be cited where defense requirements stimulated technology or technical developments. Naval artillery has led the way for the development of massive steel forging techniques; conversely, the power of naval weapons created the need for improved armor plates. The gyrocompass was originally required by ship navigation and was eventually perfected for airborne applications. The very early years of "wireless" communications were essentially supported by the needs of the U.S. and allied armed forces.

Since World War II, the role of technology has radically changed. The advent of jet aircraft, long-range guided missiles, radars, lasers, space-based sensors, digital communications, nuclear devices and many other new technical capabilities have changed the art of land, sea, and air warfare, where available and potential technologies can profoundly influence some essential new aspects of military concepts, doctrines, and strategies. The Strategic Defense Initiative is an excellent illustration.

With the enormously increased impact of technology, the role of the defense industries has also changed. They have had to invest in facilities, equipment, and professional skills that are specifically focused on defense needs; in fact, they have had to invest in advanced technical research and even in some basic research to make sure that the military has the best available state-of-the-art at hand and that the scientific and technological aspects of the potential threat are properly assessed. To remain profitable, the defense industries have had to rely on a reasonably stable stream of defense orders, together with equitable arrangements for overhead reimbursements and consideration for independent research and development.

When the nation's interest in military strength is paramount and the economic circumstances allow, the defense industries can provide for the required R&D investment. When budget trends are adverse, our defense industries, even with the strong support of the Department of Defense, can no longer keep up with the rapid pace of technological change. It is then that the government laboratories, aided by university participation, must provide technical leadership and continuity.This is precisely the situation in which we find ourselves now, and in which we appear likely to remain for some time.

The Department of Defense, together with all other agencies interested in science and technology, including the Office of Science and Technology Policy, must be alert to this problem, must see to it that the Government in-house technical capabilities, primarily represented by the national laboratories, be focused on those areas of technology that have the highest possible leverage on our national security and on our military defense needs. This must hold not only for what we can see now, but must also provide for 20 to 25 years in the future. We must find ways to enlist the best and most dedicated university scientists in this endeavor. Industry must be encouraged to spend its independent research and development funds on endeavors that will truly improve and advance the state-of-the-art in technology, rather than on routine competitions, or on maintaining large "capability pools" with mundane engineering activities described as "research."

The Government cannot assume the whole burden for maintaining and enhancing the nation's defense technology posture. Industry must, under fluctuating but often stringent budget constraints, look to sources of funding other than the overhead generated by defense business alone. This is one reason why private enterprises engaged in defense business must have the motivation and the opportunity to apply some of their advanced technologies to programs aimed at the private sector.

The Government has steadfastly supported commercial opportunities for defense contractors. Recent efforts to facilitate private investment in commercially oriented diversification and increased competitiveness are expected to further strengthen industrial R&D investment. The commercial aircraft industry is an outstanding successful example. Many of the aircraft developments starting in the 1930s can be traced to Government efforts; the major purpose and effect of the National Advisory Commission on Aeronautics (NACA) activity was to create advanced technology that would lead to primacy in aeronautics and air transportation. Ever since, the U.S. aircraft industry has been a world leader; and at the same time supplied several commercial derivative aircraft to the military services. A by-product, of course, is the major positive contribution to the U.S. balance-of-trade.

Even today, it is to be hoped, and for some time to come, the symbiosis between military and civil aircraft developments will continue. The National Aerospace Plane program is an important illustration: the technical advances, the design concepts, the laboratory experiments involving hypersonic ramjets are fully supported by Government research. Technology maturation and the construction of a flight demonstrator will be financed by the government. It is expected that the National Aerospace Plane will, in addition to contributing to our military aircraft and space-related missions, result in a number of interesting commercial applications. At that point, we would expect to see private investment in the development of prototypes for commercial applications. The "Orient Express" spanning the Pacific Ocean is a possible example of the commercial potential.

To sum it up at this point: defense technology is becoming so vast and so complex that neither the military nor the civil sector alone can support the necessary advance at the required rate of progress. Synergy and cooperation between the two sectors are the prevailing imperatives. Once the nation's full technology capabilities are brought to bear on the national security requirements, the needs and opportunities can be anticipated and the corresponding research efforts undertaken. Spinoffs to the civil sector, forthcoming from defense programs, should strengthen industry so that it can contribute to the military needs more effectively than if the two sectors were kept strictly separated.

Let us now address some of the deficiences.

First, there is insuffcent incentive for industry to conduct basic research. It can be quite expensive and payoff in terms of military applications or in terms of industrial profitability is generally a decade or more away. The remedy I suggest is that the Government systematically increase 6.1 type programs both in its in-house research and in the independent R&D programs that are financed by overhead accounts on Government procurements. The Government laboratories responsible for 6.1 type programs should have a specific say on the nature and direction of basic research programs conducted by industry, with the proper protective measures in respect to proprietary data. University experts and government laboratory personnel should consult with industry's leading scientists to define the direction and priorities of basic research.

The OSTP attempts to encourage this process through its relationships with the White House Science Council, the National Academy of Sciences, the National Science Foundation, and other expert groups with industry participation.

A second major problem, especially in the presence of limited resources, is how to prioritize and share efforts in advanced and exploratory research; i.e. what must be done when the broad objectives in a given area of endeavor are clearly understood and several confluent technical disciplines must be advanced simultaneously. The factors that are brought to bear on this aspect of the government problem are (1) The state of the particular technology area, i.e., how far are we from the desired technical performance/cost levels? (2) The effectiveness of the competing approaches; i.e., how much relative progress can we buy for a given investment level? (3) The leverage of technology on the overall system performance or achievement of mission objectives; and finally (4) The availability and readiness of competent technical teams. The industrial sector would certainly add arguments about competitive potential, market strategies and profitability—considerations that are not directly related to government interests.

An illustration of the problems encountered under this heading is the current situation in the semiconductor industry. There are indications that the industry may be threatened with loss of its international competitiveness. Since the Department of Defense is one of the major consumers of high-performance microcircuitry, the problem has clear national security implications. The Defense Science Board and the National Science Foundation have jointly concluded that advanced semiconductors are critical to systems associated with the needs of national security. Both private industry, under the aegis of the Semiconductor Industries Association, and the Defense Science Board recommend an approach to recover industry-wide competitiveness vs. foreign manufacturers. This approach includes sustained government subsidies to industrial prototype fabrication facilities. OSTP, with the support of the White House Science Council, will examine the basic causes of the present situation, investigate alternatives to government subsidies, and recommend appropriate measures of technology development and investment programs to address the problem.

The last problem I wish to address is the transfer of Government-generated R&D to the civil sector. There are specifically designed programs, within NASA for instance, which have for basic purpose the transfer of advanced technology to commercial applications. In some other cases, transfer occurs as a matter of course as large aerospace companies exchange people and activities between their government and commercial market divisions. Government laboratories often have in-house programs—"Presentations to Industry" type sessions— where the achievements of specific laboratory activities are brought to private-sector attention. Often presentations are followed by negotiations for competitive or sole-source follow-up. But at any rate, the technology, within the limitation of security classification, and proprietary limitations, is being transferred. Other programs are aimed at relatively small business corporations.

We have not done all that we can do in this area. The President's competitiveness initiative, submitted to Congress in January, contains provisions to address specifically this issue. We must all work to do better at facilitating transfers to the civil sector.

Thank you, Mr. Chairman and Members of the Subcommittee; I would like to answer your questions now, if I can.

Senator **Bingaman**. Thank you very much.

Mr. Bloch, go right ahead.

STATEMENT OF ERICH BLOCH, DIRECTOR, NATIONAL SCIENCE FOUNDATION

FEDERAL R&D EFFORT

Mr. **Bloch**. Thank you, Mr. Chairman, and members of the subcommittee.

I appreciate the opportunity to be here to provide the views of the National Science Foundation on the state of the Nation's science and engineering base.

The National Science Foundation supports basic research and education in science and engineering, primarily in the Nation's colleges and universities.

This year we will spend $1.7 billion to support about 13,000 projects.

To put that dollar figure in perspective, I want to say that this is only about 2½ percent of the total Federal R&D effort. But we are the largest Federal supporter of basic research in the physical sciences and engineering, funding about a third of all such work.

The foundation can choose projects for support with greater flexibility than agencies oriented to a specific mission. But NSF does have a mission: the overall health of American science and engineering.

That in turn affects the competitiveness of American industry and is closely related to the subject today, namely, national defense.

Why should we be concerned with economic competitiveness? The answer is that for too long we have tended to see our economic problems as a result of forces largely beyond our control, such as unfair trade practices or low wages in other countries, or unfavorable exchange rates.

The new concern with competitiveness that we all hear about everyday makes us realize that the most important thing is what we do ourselves.

To succeed, we must exploit our own most important resources: new knowledge, and well educated people. These are the key elements of a competitive economy.

New knowledge which we get through basic research is important because it provides ideas for the new products that we need to compete in high technology areas. And new knowledge also shows us how to raise productivity in low technology manufacturing and service industries.

Education is important because talented and well trained people are the source of the ideas, and the main resource needed to put them into practice.

Sufficient numbers of well educated people are a common concern of both the civilian and the defense communities. As this committee is well aware, new knowledge and education are prerequisites of both economic and military strength.

You provided some questions in which you expressed some interest. And I can't answer them all here, but I would like to comment briefly on a few of them.

U.S. TECHNOLOGY BASE

First, what is the general state of the U.S. technology base, and how does it compare to others?

The short answer is that the U.S. technology base is still the best in the world without question. We have many fine people working in outstanding laboratories in industry, and in universities, and in the Federal laboratories.

We don't have the dominating lead that we did 20 years ago. Partly this is because the rest of the world has caught up. The devastation of World War II has been repaired, and many nations that 20 years ago were still in the early stages of development are now rapidly becoming advanced industrial powers.

This is especially true of the nations of the Pacific rim.

I have two graphs which are attached to my testimony that you have in front of you which illustrates these trends.

The first shows R&D as a proportion of GNP for the major nations. The important point is that the U.S. lead, as measured by this parameter, has essentially disappeared over the last two decades.

Today our effort is comparable to, but no greater than, that of the other advanced industrial nations.

The second chart shows what happens when we allow for the very large defense oriented component of our R&D effort. Because they do not match our strong defense effort, Japan and Germany are well ahead of us in civilian oriented R&D effort.

It has often been argued that the large amount of R&D devoted to defense purposes has a major spin-off effect on civilian technologies, and that is true. But the reverse is equally true.

Advances in civilian basic research have had major payoffs for defense technology. And I cite in my written testimony two examples, semiconductors, which were already mentioned by Dr. Graham, which at one time were a preeminent concern of defense, but which over the past 15 or 20 years really have been pushed ahead by the civilian sector.

The second example that I cite is one that is very current today, superconductivity, which is an excellent case in point. Recent announcements of increases in the temperature at which superconductivity occurs means that the cost of cooling to superconducting conditions can be reduced 100 fold. And again, it's the civilian sector that will probably lead in the application of that very important technology.

The second question you asked is whether defense is consuming the technology base faster than it's building it up.

BASIC RESEARCH

One way to answer that question is to look at the proportion of the overall Federal R&D effort that goes for basic research. A major objective of the administration has been to redirect civilian R&D funding from applied research and especially development—the natural responsibility of industry, I might add—to basic research.

This has largely been accomplished. Basic research was 26 percent of nondefense R&D in 1980, and today it is 39 or 40 percent.

Despite this growth in civilian basic research, however, the fraction of the total Federal R&D effort that goes for basic research has declined. That fraction rose steadily through the 1960s and 1970s, reaching a high of almost 17 percent in 1983, and since then it has declined each year and is expected to be about 14 percent in 1988.

Finally, the share of Federal R&D going to universities has also declined. This is significant. After all, total spending for basic research next year will be more than 40 percent above the 1983 levels.

I think it is significant. Our pool of basic research knowledge needs to be constantly replenished. A rapid rate of technological development cannot be maintained for long without a steady flow of new knowledge, new ideas, and new people, trained to carry on the work.

Superconductivity is only one current example. We need many more examples.

There must be a reasonable balance between basic research on the one hand, and applied and development work on the other.

SUPPORT FOR ACADEMIC INSTITUTIONS

What is important is that there be strong, steady support for basic research and education, in science and engineering, in all the departments that are concerned about R&D.

The need to increase support for academic institutions was a central recommendation of the White House Science Council's report on the health of U.S. colleges and universities.

Chaired by David Packard and Allen Bromley, the report was strongly endorsed by the President. Their recommendations were one source of the President's competitiveness initiative, under which support for university basic research and education programs, and science and technology centers, will be sustantially increased.

In part this will be accomplished, but only in part, by doubling over the next 5 years the budget of the National Science Foundation.

But that alone will not be sufficient. Other agencies must also help implement the President's initiative by increasing their support of university basic research.

Finally, I would like to comment on cooperation in research and education programs between the Foundation and other agencies.

INTERAGENCY COOPERATION

NSF has an important program called global geosciences aimed at better understanding of the Earth's oceans and atmosphere.

Recently, this effort has attracted important participation from the Navy, NOAA, NASA, and the Geological Survey.

In fact, Admiral Brad Mooney, who is in this room today, expressed the consensus when he told a recent meeting of the ocean principals group that the Navy is committed to interagency global geosciences, and that not only are they players, but that they want to be partners.

This sort of cooperation is an important way to use our resources more efficiently and increase the rate at which we develop new knowledge and new technology that can be used both for the civilian sector and the defense sector equally.

The U.S. antarctic research program is a second area of long term cooperation between the Foundation, the Navy and the Coast Guard.

A third important cooperation has developed between NSF and the National Security Agency in supporting "pure" mathematics. Until recently, NSF has been the only significant supporter of pure mathematics.

Following a major report indicating a need for more basic mathematics, however, NSA reassessed the importance of this area to its mission, and agreed to provide several million dollars annually. That is a significant increase for very important research. It will also help attract more young people to this field.

Another cooperative effort joins NSF, DARPA, and ONR in support of research at the University of Princeton on advanced computer architectures. The idea is to use very large memory capacity in what is known as a massive memory machine to solve large models of atmospheric circulation and other complex processes.

These examples illustrate a healthy trend toward better support of basic research in the mission agencies, but we can go further.

In particular, we should have joint support of some of the new science and technology centers in the President's competitiveness initiative. NSF has taken the lead, but other agencies must be, and should be, involved.

THE KNOWLEDGE BASE

Mr. Chairman, I will close by observing that there is always a tendency to try to move beyond the existing knowledge base. We need new technology of all sorts. And it is all too easy to promise that it can be developed in a reasonable time and at a reasonable cost.

Nor will it be true if we lack enough well trained scientists, engineers, and technical support personnel to meet the needs of both the Government and the private sector.

Therefore we must maintain a proper balance among basic research, education and other parts of the R&D budget. Supporting basic research always involves an element of faith, because one cannot know in advance what will be learned. Neither can we know in advance what problems we will face, or what programs will be necessary.

Thus, above all, it's essential to maintain the knowledge base and the supply of trained people. That will allow us to respond flexibly and forcefully to changed circumstances.

Thank you very much.

[The prepared statement of Mr. Bloch follows:]

PREPARED STATEMENT OF ERICH BLOCH, DIRECTOR, NATIONAL SCIENCE FOUNDATION

Good Afternoon. It is a pleasure to be here to provide the views of the National Science Foundation on the State of the nation's science and engineering base.

I know you have a long list of questions in mind, so I will take only a few minutes to make a few general comments.

The National Science Foundation supports basic research and education in science and engineering, primarily in the nation's colleges and universities. This year we will spend $1.7 billion to support about 13,000 projects.

To put that dollar figure in perspective, the foundation provides only about 2.5% of total Federal R and D support. But we are the largest Federal supporter of basic research in the physical sciences and engineering, funding about a third of all such work. In some fields we are virtually the only agency actively involved.

The foundation can choose projects for support with greater flexibility than agencies oriented to a specific mission.

But NSF does have a mission: The overall health of American science and engineering. That, in turn, affects the competitiveness of American industry, and is closely related to national defense.

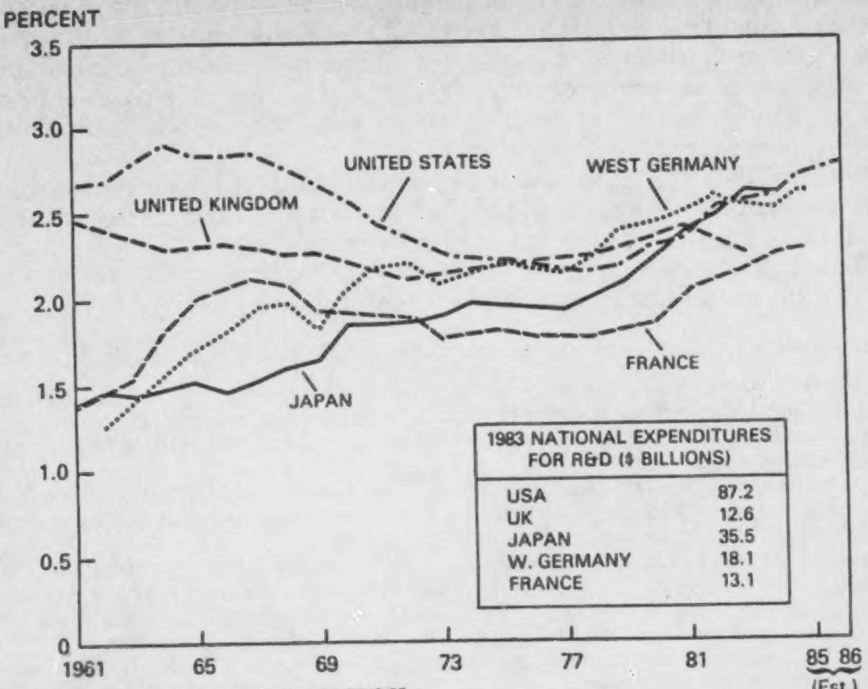
First, what is the general state of the U.S. technology base, and how does it compare to others?

The short answer is that the U.S. technology base is still the best in the world, without question. We have many fine people working in outstanding laboratories in industry, in universities, and in the federal laboratories.

But we don't have the dominating lead that we did twenty years ago. Partly this is because the rest of the world has caught up: The devastation of World War II has been repaired, and many nations that twenty years ago were still in the early stages of development are now rapidly becoming advanced industrial powers. This is especially true of the nations of the Pacific rim.

I have two figures here which illustrate the gross trends.

NATIONAL EXPENDITURES FOR PERFORMANCE OF RESEARCH AND DEVELOPMENT AS PERCENT OF GROSS NATIONAL PRODUCT BY COUNTRY

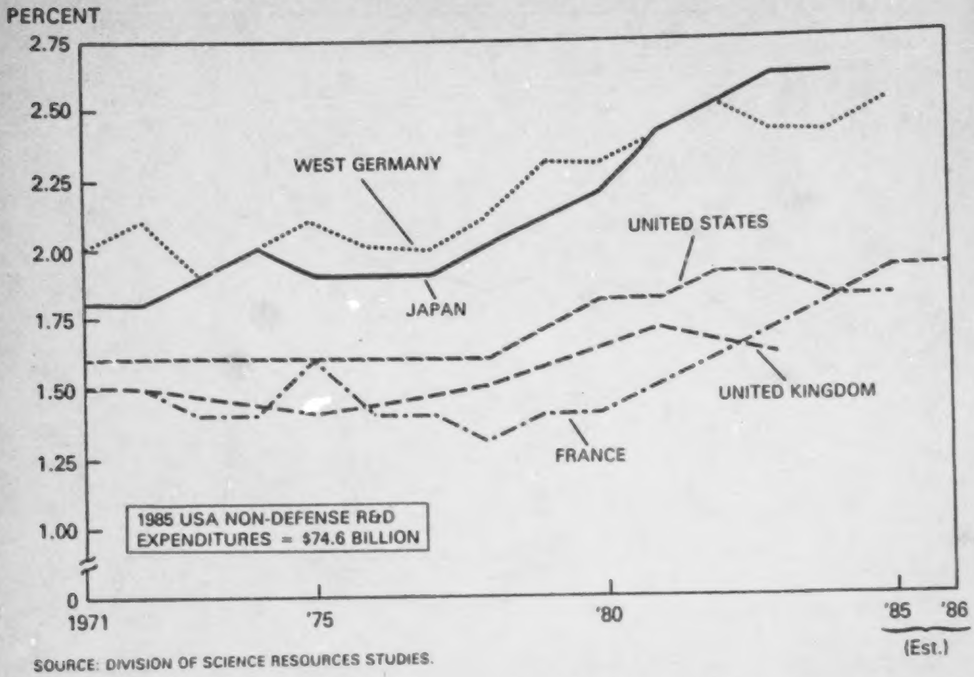


1983 NATIONAL EXPENDITURES FOR R&D ($ BILLIONS)	
USA	87.2
UK	12.6
JAPAN	35.5
W. GERMANY	18.1
FRANCE	13.1

SOURCE: DIVISION OF SCIENCE RESOURCES STUDIES

The first figure shows R and D as a proportion of GNP for the major nations. The important point is that the U.S. lead in terms of this level of effort has essentially disappeared over the last two decades. Today our effort is comparable to, but no greater than, that of the other advanced industrial nations.

NON-DEFENSE R&D EXPENDITURES AS A PERCENT OF GROSS NATIONAL PRODUCT (GNP) BY COUNTRY

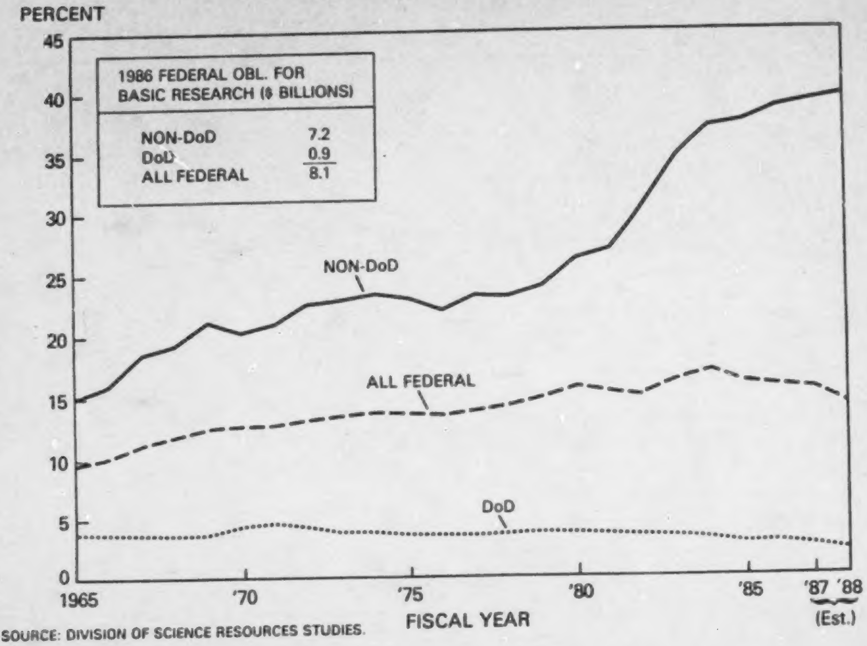


SOURCE: DIVISION OF SCIENCE RESOURCES STUDIES.

The second chart shows what happens when we allow for the very large defense-oriented component of our R and D effort. Because they do not match our strong defense effort, Japan and Germany are well ahead of us in civilian-oriented R and D effort.

It has often been argued that the large amounts of R and D devoted to defense purposes have a major "spin-off" effect on civilian technologies.

FEDERAL BASIC RESEARCH AS A PROPORTION OF TOTAL FEDERAL R&D, BY CATEGORY



SOURCE: DIVISION OF SCIENCE RESOURCES STUDIES.

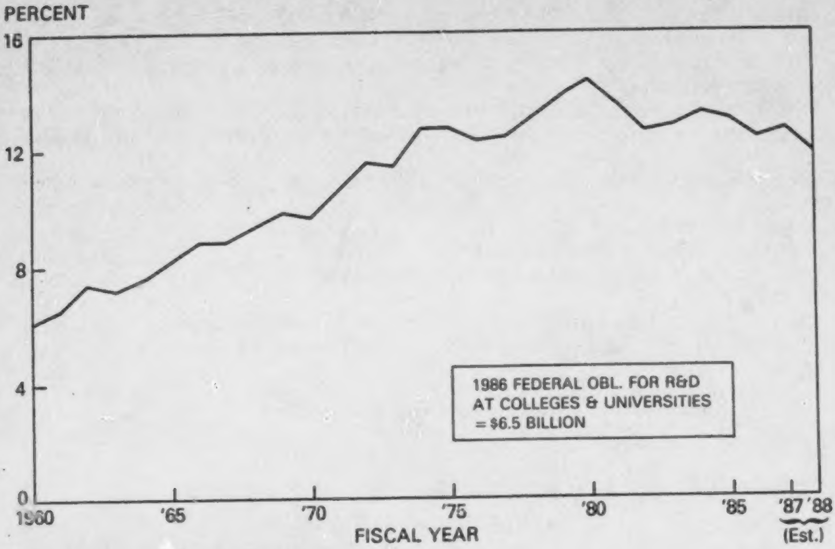
But the reverse is probably even more true: Advances in civilian basic research have had major pay-off's for defense technology.

Semiconductors are perhaps the best historical example of this phenomenon. During the 1970's the revolution in semiconductor technology was driven by market forces encouraging rapid innovation in civilian products. By the end of the 70's it was clear that military technology was not incorporating these advances.

The VHSIC [very high speed integrated circuits] program was established in an attempt to catch up, and to adapt innovations made in the civilian area to military uses.

Finally, the share of federal R and D going to universities has also declined, as shown in the fourth figure.

FEDERAL OBLIGATIONS FOR R&D AT UNIVERSITIES AND COLLEGES AS A PERCENTAGE OF ALL FEDERAL R&D



SOURCE: DIVISION OF SCIENCE RESOURCES STUDIES.

Is this significant? After all, total dollar spending for basic research next year will be more than 40% above 1983 levels.

I think it *is* significant. Our pool of basic research knowledge needs to be constantly replenished. A rapid rate of technological development cannot be maintained for long without a steady flow of new knowledge, new ideas, and new people trained to carry on the work. Superconductivity is only a current example—we need much more of this.

There must be a reasonable balance between basic research on the one hand and applied and development work on the other. What is important is that there be strong, steady support for basic research and education in science and engineering.

The need to increase support for academic institutions was the central recommendation of the White House Science Council's Report on the Health of U.S. Colleges and Universities.

Prepared by David Packard and Alan Bromley, the report was strongly endorsed by the President. Their recommendations were one source of the President's competitiveness initiative, under which support for university basic research and education programs in science and technology will be substantially increased.

In part this will be accomplished by doubling, over the next five years, the budget of the National Science Foundation. But that alone will not be sufficient; other agencies must also increase their support of universities.

The major reason for increasing support for universities is that they combine research with education. In the course of research they also educate the people that we need, in industry and government, for both civilian and defense purposes.

Another cooperative effort joins NSF, DARPA, and ONR to support research at Princeton on advanced computer architectures. The idea is to use very large memory capacity—in what is known as a "massive memory machine"—to solve large models of atmospheric circulation and other complex processes.

These examples illustrate a healthy trend towards better support of basic research in the mission agencies. But we can go farther.

In particular we should have joint support of some of the new science and technology centers in the President's competitiveness initiative. NSF has taken the lead, but other agencies, especially in defense, should be involved.

Mr. Chairman, I will close by observing that there is always a tendency to try to move beyond the existing knowledge base. We need new technology of all sorts, and it is all too easy to promise that it can be developed in a reasonable time and at a reasonable cost.

But this will not be true if the knowledge base is lacking. Instead, existing technologies will be pushed to, and then beyond, their natural limits. Progress will be slow and expensive. We have seen it before in programs like the supersonic transport and synthetic fuels.

Nor will it be true if we lack enough well-trained scientists, engineers, and technical support personnel to meet the needs of both the government and the private sector.

Therefore, we must maintain a proper balance among basic research, education, and development.

Supporting basic research always involves an element of faith, because one cannot know in advance what will be learned.

Neither can we know in advance what problems we will face, or what programs will be necessary.

Thus above all, it is essential to maintain the knowledge base, and the supply of trained people, that will allow us to respond flexibly to changed circumstances. Thank you.

Senator BINGAMAN. Thank you very much.

Dr. Press.

STATEMENT OF DR. FRANK PRESS, PRESIDENT, NATIONAL ACADEMY OF SCIENCES

Dr. PRESS. Mr. Chairman, I too am delighted to be here today to help launch your series of hearings on the defense industrial base and the science and technology base that supports it.

Before I address your agenda in detail, I would like to make a general observation that is implicit in your questions, but is easily obscured in the wider public debate over U.S. competitiveness and what should be done about it.

Many advanced technologies of military value, from microelectronics to new materials now derive from the commercial sector. And this dependence is likely to increase.

Indeed, the Packard Commission has urged the Defense Department to use even more commercially derived products in military systems.

This trend is a partial reversal of the pattern that prevailed after World War II in which defense research, development and procurement fed innovations in commercial electronics, communications, numerically controlled manufacturing equipment, airframe design, avionics, and other sectors, and contributed to the growth of new industries that led the world.

Today, however, military hardware requirements are becoming more specialized. Radiation and shock hardened integrated circuits, Stealth aircraft materials, and some components of a strategic defense capabilities are examples.

These highly sophisticated technologies are being developed without regard to the cost constraint, mass producibility requirement, and the needs of commercial markets.

So expectations that encouragement of military innovations will automatically have commercial benefits have to be carefully justified, or they can have unfortunate results where they govern R&D investments.

Stated succinctly, spillover from the defense to the civil sector is still important, as my colleagues have mentioned. But it may well be that a dollar of defense R&D contributes less to the civilian sector today than it did in the past, and much less than today's Japanese R&D dollar.

Let me return to the general concerns that motivate your inquiry. I hope it will be useful if I organize my comments around various stages of the innovation process: research, development, manufacturing and marketing.

Of course, innovation is not a continuous process that flows linearly from basic research through marketing. It occurs at various entry points, and as I proceed, I shall touch on some of the questions that you have posed.

First, the science and technology base. The unprecedented rate of progress in almost all scientific fields results in factors that are peculiar to our times: the large number of scientists at work; the introduction of instruments of extraordinary sensitivity; the ability to perform experiments on a scale and with a precision heretofore considered unachievable; the ready availability of large computers that permit rapid analysis of large amounts of data; and all of these leading to brilliant syntheses and theories that change the course of entire scientific fields.

It is in this realm above all that I continue to have confidence in U.S. performance, vis-a-vis our competitors as well as our adversaries.

In the United States a unique and advantageous system has evolved, with some 20,000 schools offering degrees in science and engineering, of which some 100 are considered research universities by the scale of their research effort and by their successful integration of teaching with research.

These institutions, more than their counterparts in other industrial democracies, enjoy good connections to industry and the agricultural sectors and to Government laboratories.

This system has its problems to solve and adjustments to make. But it is fundamentally sound, thanks in part to steady increase in Federal funds since the late 1970s. And it has no match.

A recent analysis by the British Royal Society of public scientific papers in the scientific literature, which is the typical product of basic research, showed that the United States retains a commanding share of world output: 37 percent of total published papers and 52 percent of citations to recent papers.

By contrast, the Japanese shares are only 7 and 6 percent respectively although increasing more rapidly than any other country.

The shares of British papers, traditionally the second ranked power, are on the decline.

However, as this subcommittee knows, the U.S. basic research system is under stress. And that is true in particular of the research universities where the bulk of our basic research is done.

The specifics go to the lack of facilities, demographic changes affecting student and faculty, ever more costly instrumentation; and inadequate support for beginning scientists.

This issue is clearly of concern to the Department of Defense, and I believe to this subcommittee. Indeed, a prime purpose of the Department's support of basic research, especially through 6.1 funds, is to strengthen DOD ties with academic basic research.

That goal is simply a recognition that excellence in science is essential to excellence in technology. And that is certainly true of technologies of military importance.

Hence the DOD support of basic research through the 6.1 program is both proper and vital to the security of the United States.

While that principle is generally acknowledged, its support is, I believe, inadequate.

The senior officials of the Department of Defense, including Dr. Kerber, have been consistently and strongly supportive of the 6.1 program. Nevertheless, after substantial growth in the early years of this decade, we've seen recent reductions in 6.1 levels.

In part that comes from macro adjustments, sometimes Congressionally imposed, of the overall DOD budget that directly affects the 6.1 programs.

Those same budgetary pressures have, on occasion, led middle level managers in DOD to reallocate 6.1 funds for programs that do not fall within the widely accepted definitions of fundamental and basic research.

For fiscal year 1986, the Congress wisely exempted basic research from across the board cuts in defense R&D. However, in its cuts in the 1987 defense R&D budget, the Congress included the 6.1 funds.

Indeed, basic research was one of only two DOD R&D areas to have its budget reduced below 1986 levels, and DOD was the only major R&D agency to have its basic research budget cut from 1986 to 1987.

Unfortunately, this included a cut in DOD's university research initiative, which has so much potential for enhancing and strengthening academic research.

I don't have to remind you of the technologies that came out of academic research that are of such use today to DOD: the stored program computer; computer memory; communication theory, which is the basis of DOD communications today; lasers and masers; artificial intelligence; exotic materials of all kinds; sensors; underwater acoustics and the whole basis for submarine detection; and digital signal processing. All of these came out of academic research and contributed to very important capabilities that are deployed today.

The cuts that I mentioned before were a mistake, one that I very much hope the Congress will rectify as it acts on the fiscal year 1988 budget request.

The answer is to provide significant increases in 6.1 funds, and to protect them from diversions.

I again want to emphasize that senior officials in DOD have been strongly supportive of the Department's basic research program and have sought to protect it vigorously, whatever the budgetary pressures put on them.

And I urge this subcommittee to give them its support.

In contrast to the previous decade, the first half of the 1980s has seen in the United States a resurgence of private sector investments in R&D, as well as a massive increase in defense R&D.

In both cases development funds as distinct from basic research represented the major share. Although Germany and Japan devote larger proportions of their Gross National Product to civilian R&D than does the United States, it is nevertheless impressive that in

1983 American industry, including Government supplied funds, outspent Japan and the European Community countries combined.

I am reasonably sanguine, too, about the U.S.-Soviet rivalry. As the Academy's panel on national security controls on international technology transfers, chaired by Lew Allen, noted in its report issued last month, the East-West technological gap is not decreasing in most dual use areas, despite aggressive Soviet efforts to acquire Western technology.

Indeed, in a number of technologies, the Soviet's copycat approach, compelled by the absence of a vital commercial sector, seems to ensure mediocrity and delay.

Of greater concern is the rising comparative quality of Warsaw Pact fielded military equipment, a function both of the very substantial resources the Soviets apply to the development of uniquely military technology and of the protracted U.S. procurement cycle.

The Japanese commercial challenge is also a source of concern. Numerous recent comparisons of U.S. and Japanese technology have concluded that in the space of no more than a decade, the once commanding U.S. lead has been significantly narrowed or surpassed in a variety of areas: semiconductors, semiconductor materials and fabrication equipment, optoelectronics, certain types of computer hardware, robots and factory automation, various kinds of telecommunications equipment, certain types of biotechnology applications, and some advanced materials such as fine ceramics.

A familiar theme of these assessments is that the United States retains superior capabilities in basic science but lags in the transformation of new concepts into commercial products and in the ability to manufacture them at low cost.

After 20 years of unrivalled U.S. dominance, dependence on Japanese sources of critical manufacturing equipment for electronic devices, materials and components, including components for supercomputers, is a real prospect.

The economic and national security concerns would be serious enough even without a downstream ripple effect on computers and telecommunications equipment where the United States is clearly ahead; but this may be an inevitable consequence.

Let me say a few words about manufacturing. In most sectors, production is the costliest component of the innovation process. Without the availability of capital at reasonable cost, together with incentives for investment in plants and equipment, technological advances cannot contribute to productivity gains and improved products.

In fact without the prospect of commercialization, there is little reason to undertake R&D in the first place.

A combination of macroeconomic and sociocultural factors and, in some cases, direct government intervention, has worked exceedingly well for the Japanese in this regard, enabling them in most cases to manufacture high quality products at comparatively low cost.

In contrast, at various times and in varying degrees, high U.S. interest rates, inflation, high costs of capital, excessive regulation, and consumption-oriented tax policies have discouraged investment and inhibited productivity growth.

Private sector management decisionmaking has not fostered the competitive stance of many American firms.

There are indications that a renewal is underway in the United States to improve manufacturing capability. Investment by U.S. industry in modern production facilities, based on advanced process technology, has grown in recent years. Radical restructuring and cost cutting and less adversarial labor-management relations have also helped bring about an acceleration of productivity growth rates in manufacturing.

I am less sanguine about the defense sector. According to studies by our Manufacturing Studies Board, the defense industries have invested in new equipment and advanced process technology at only one-half the rate of the non-defense sector. Our defense plants are filled with out of date equipment.

Here, procurement practices are discouraging. Competition for contracts is frequently limited and in any case dominated by considerations of product performance, not production efficiency.

Once contracts are awarded, moreover, the conventional commercial pressures to lower costs do not exist. Reducing costs lowers the base on which profits are calculated.

To compensate for these disincentives, the Defense Department has provided modest direct funding for process improvements through the military services' Manufacturing Technology, or ManTech program. Yet, by last year the Army ManTech program had been largely dismantled and the Navy program reduced and redirected. The Air Force program has remained stable but has not grown as planned.

A very few words about marketing. For a multiplicity of reasons, exports have been a major factor in the economies of Japan and Europe, and now the newly industrialized countries. The imperative to export has not been as strong for the United States, with its large domestic market. And yet, American high technology industries have become dependent on world markets in part for the returns necessary to finance escalating innovation costs.

It is therefore of considerable concern from either an economic welfare or a national security perspective that the U.S. trade balance in R&D intensive goods has plummeted from a record $27 billion surplus to a current deficit estimated at roughly $3 billion, and all of this—in only 6 years.

The web of national policies affecting trade by design or inadvertence is a complex one, and we need not attempt to disentangle it here. But I would like to refer again briefly to the Allen panel report on national security export controls, for these restrictions on trade that are motivated solely by concerns about military security. That panel estimated that in 1985 nearly 40 percent of U.S. exports in manufactures, almost all to non-Soviet bloc countries—that is about $62 billion worth of exports—were subject to prior Government review and approval for national security reasons.

And because we are more stringent in applying controls to more items than are our CoCom allies, the U.S. exporters had a significant competitive disadvantage. In Europe especially, efforts are being made to de-Americanize, to design around or find alternative sources to U.S. parts, components, and equipment.

The flaws in the control regime that drew the attention of the current administration when it entered office were real and its efforts have brought about needed improvements. But they have overcorrected and neglected the need to balance both military security and economic vitality. And I remind you that the economic vitality of our high tech industries feeds back to our performance in military technology.

Mr. Chairman, I have discussed only a few of the issues that deserve the committee's attention and, rather than prolong my statement any further, let me offer our assistance as you proceed with your investigation. In particular, we are in the process of compiling the most recent studies of our institutions bearing on the issues of competitiveness in key industrial sectors, and we shall be pleased to make these available to you as they are completed.

Thank you.

[The prepared statement of Dr. Press follows:]

PREPARED STATEMENT OF DR. FRANK PRESS, PRESIDENT, NATIONAL ACADEMY OF SCIENCES

Mr. Chairman and members of the subcommittee: I am delighted to be here to help launch your series of hearings on the defense industrial base and the science and technology base that supports it.

Before I address your agenda in detail, I would like to make a general observation that is implicit in your questions but is easily obscured in the wider public debate over U.S. competitiveness and what should be done to improve it. U.S. defense needs, and the conditions for U.S. success in global commercial markets are not as closely coupled as they may have been in past decades.

Many advanced technologies of military value—from microelectronics and computers to new materials—now derive from the commercial sector; and this dependence is likely to increase. Indeed, the Packard Commission has urged the Defense Department to use even more commercially derived products in military systems. This trend is a partial reversal of the pattern that prevailed after World War II, in which defense research, development, and procurement fed innovations in commercial electronics, communications, numerically controlled manufacturing equipment, and airframe design and avionics.

At the same time, military hardware requirements are becoming more specialized. Radiation hardened integrated circuits, "stealth" aircraft materials, and some components of a strategic defense capability are examples. These highly sophisticated technologies are being developed without regard to the cost constraints, mass producibility requirements, and the needs of commercial markets. So expectations that encouragement of military innovations will automatically have commercial benefits have to be carefully justified or they can have unfortunate results where they govern R&D investments. Stated succinctly, a dollar of defense R&D contributes less to civilian sector competitiveness today than it did in the past.

Let me return to the general concerns that motivate your inquiry. I hope it will be useful if I organize my comments around various stages of the innovation process—research, development, manufacturng, and distribution. Of course, innovation is not a continuous process that flows linearly from basic research through marketing. It occurs at various entry points. As I proceed, I shall touch on many of the questions you have posed.

SCIENCE AND TECHNOLOGY BASE

The unprecedented rate of progress in almost all scientific fields rests on factors that are peculiar to our times: the large number of scientists at work, the introduction of instruments of extraordinary sensitivity, the ability to perform experiments on a scale and with a precision heretofore considered unachievable, the ready availability of computers that permit rapid analysis of large amounts of data, and all of these leading to brilliant syntheses and theories that change the course of scientific fields.

It is in this realm above all that I continue to have confidence in U.S. performance—vis-a-vis our competitors as well as our adversaries. In the United States a unique and advantageous system has evolved with some two thousand schools offering degrees in science and engineering, of which some one hundred are considered research universities by the scale of their research effort and by their successful integration of teaching with research. These institutions, more than their counterparts in other industrial democracies, enjoy good connections to the industrial and agricultural sectors and to government laboratories.

This system has its problems to solve and adjustments to make. But it is fundamentally sound, thanks in part to steady increase in federal funds since the late 1970s. And it has no match.

However, while the U.S. basic research system is now sound, it is under stress. And that is true in particular of the research universities, where the bulk of basic research is done. The specifics go to lack of facilities, ever more costly instrumentation, inadequate support for young people, inadequate support for established investigators in many fields, and the like.

That issue is clearly of concern to the Department of Defense and, I believe, to this Subcommittee. Indeed, a prime purpose of the Department's support of basic research, especially through 6.1 funds, is to strengthen its ties with academic basic research. That goal is simply a recognition that excellence in science is essential to excellence in technology. And that is certainly true of technologies of military importance. Hence, the DOD support of basic research through the 6.1 program is both proper and vital to assuring the security of the United States. While that principle is generally acknowledged, its support is, I believe, inadequate.

The senior officials of the Department of Defense, including Dr. Kerber and his predecessor, Dr. DeLauer, have been consistently and strongly supportive of the 6.1 program. Nevertheless, after substantial growth in the early years of this decade, we've seen recent reductions in 6.1 levels. In part that comes from macroadjustments, sometimes Congressionally-imposed, of the overall DOD budget, that directly affected the 6.1 program. Those same budgetary pressures have on occasion led middle-level managers in DOD to reallocate 6.1 funds for programs that do not fall within the widely accepted definitions of fundamental and basic research.

For FY 1986, the Congress wisely exempted basic research from across the board cuts in Defense R&D. However, in its cuts in the FY1987 defense R&D budget, the Congress included the 6.1 funds. Indeed, basic research was only one of two DOD R&D areas to have its budget reduced below 1986 levels; and DOD was the *only* major R&D agency to have its basic research budget cut from 1986 to 1987.

I think that was a mistake, one that I very much hope that the Congress will rectify as it acts on the 1988 budget request.

Progress in technology is keeping pace with advances in scientific knowledge. Information transfer between scientist and technologist is being accelerated by new relationships in the United States between research universities and industry. Indeed, the flow of knowledge and know-how is in both directions. In the core technologies of information processing, materials, and biotechnology, the interval between discovery and commercialization can now often be measured in years rather than decades.

In contrast to the previous decade, the first half of the 1980s has seen in the United States a resurgence of private sector interest in R&D investments, as well as a massive increase in defense R&D; in both cases, development funds represent the major share. Although Germany and Japan devote larger proportions of their gross national products to civilian R&D than does the United States, it is nevertheless impressive that in 1983 American industry (including government-supplied funds) outspent Japan and the EEC countries combined. Those proportions are changing, owing to your part to the change in exchange rates.

It is reassuring, too, that the increase in defense spending has not resulted in a shortage of engineering personnel in civilian labor markets. A recent assessment by the National Research Council concluded that, although demand is high and shortages exist in particular fields and especially in university engineering faculty, on the whole nondefense corporations have had little difficulty filling engineering positions. Current models of manpower supply and demand are inadequate to predict the effects of future military program requirements (for example, SDI); but the engineering labor market appears to be highly adaptive to external shocks.

I am reasonably sanguine, too, about the U.S.-Soviet rivalry. As the Academies' panel on national security controls on international technology transfer, chaired by Lew Allen, noted in its report issued last month, the East-West technological gap is not decreasing in most dual use areas, despite aggressive Soviet efforts to acquire Western technology. Indeed, in a number of technologies the Soviets' copycat approach, compelled by the absence of a vital commercial sector, seems to ensure mediocrity and delay. Of greater concern is the rising comparative quality of Warsaw Pact fielded military equipment, a function both of the very substantial resources the Soviets apply to the development of uniquely military technology and of the protracted U.S. procurement cycle.

The Japanese commercial challenge is also a source of concern. Numerous recent comparisons of U.S. and Japanese technology have concluded that, in the space of no more than a decade, the once commanding U.S. lead has been significantly narrowed or surpassed in a variety of areas—semiconductors, semiconductor materials and fabrication equipment, optoelectronics, certain types of computer hardware, robots and factor automation, various kinds of telecommunications equipment, certain types of biotechnology applications, and some advanced materials such as fine ceramics. A familiar theme of these assessments is that the United States retains superior capabilities in basic science but lags in the transformation of new concepts into commercial products and the ability to manufacture them at low cost. Somewhat more surprising is the judgment that Japanese government-supported targeted R&D efforts are largely on track or show promise even in the pursuit of technologies whose commercial viability is generally discounted in the United States.

According to a panel convened by the National Materials Advisory Board of the National Research Council, the United States maintains an edge only in three established areas of electronic materials processing—ion implantation, thin film epitaxy, and film deposition and etching. We have "lost control" to the Japanese of optical lithography and ceded the lead in several emerging semiconductor and optical device processes. These conclusions are generally supported by studies sponsored by the National Science Foundation and the Defense Science Board.

After 20 years of unrivalled U.S. dominance, dependence on Japanese sources of critical manufacturing equipment for electronic devices, materials, and components (including for supercomputers) is a real prospect. The economic and national security concerns would be serious enough even without a downstream ripple effect on computers and telecommunications equipment where the United States is clearly ahead. But the latter may be an inevitable consequence.

MANUFACTURING

In most sectors production is the costliest component of the innovation process. Without the availability of capital at reasonable cost, together with incentives for investment in plants and equipment, technological advances cannot contribute to productivity gains and improved products. In fact, without the prospect of commercialization, there is little reason for industry to undertake R&D in the first place.

A combination of macroeconomic and sociocultural factors and in some cases direct government intervention has worked exceedingly well for the Japanese in this regard, enabling them in most cases to manufacture high-quality products at comparatively low cost. In contrast, at various times and in varying degrees, high U.S. interest rates, inflation, high cost of capital, excessive regulation and consumption-oriented tax policies have discouraged investment and inhibited productivity growth. Private sector management decision making in many cases has not fostered the competitive stance of these firms.

There are indications that a renewal is under way in the United States to improve manufacturing productivity. Investment by U.S. industry in modern production facilities based on advanced process technology has grown in recent years. Radical cost-cutting and less adversarial labor-management relations have also helped bring about an acceleration of productivity growth rates in manufacturing.

I am less sanguine about the defense sector. According to studies by the NRC's Manufacturing Studies Board, the defense industries have invested in new equipment and advanced process technology at only one-half the rate in the nondefense sector. Our defense plants are filled with out-of-date equipment. Here, procurement practices are discouraging. Competition for contracts is frequently limited and, in any case, dominated by considerations of product performance, not production efficiency. Once contracts are awarded, moreover, the conventional commercial pressures to lower costs do not exist. Reducing costs lowers the base on which profits are calculated. To compensate for these disincentives, the Defense Department has provided modest direct funding for process improvements through the military services, Manufacturing Technology, or ManTech, programs. Yet, by last year, the Army ManTech program had been largely dismantled and the Navy program reduced and redirected. The Air Force program has remained stable but has not grown as planned.

DISTRIBUTION

For a multiplicity of reasons, exports have been a major factor in the economies of Japan and Europe and now the NICs. The imperative to export has not been as strong for the United States, with its large domestic market. And yet American high-technology industries have become dependent on world markets, in part for the returns necessary to finance escalating innovation costs. It is therefore of considerable concern, from either an economic welfare or national security perspective, that the U.S. trade balance in R&D-intensive goods has plummeted from a record $27 billion surplus to a current deficit, estimated at roughly $3 billion, in only 6 years.

The web of national policies affecting trade by design or inadvertence is a complex one, and we need not attempt to disentangle it here. But I would like to refer again briefly to the Allen panel report on national security export controls, for these restrictions on trade are motivated solely by concerns about military security.

That panel concluded that controls are necessary to impede the transfer from the West to the East of militarily important dual use technologies. But to be cost-effective the control system must be dynamic and fully multinational. Resistance to adjusting control parameters to reflect the widespread availability of lower-level technologies and insistence on maintaining unilateral and extraterritorial U.S. controls are imposing increasing costs on U.S. producers, primarily in free world markets, as well as irritating our allies.

The panel estimated that in 1985 nearly 40 percent of all U.S. exports of manufactures (predominantly non-Soviet bloc exports)—about $62 billion worth—were subject to prior government review and approval for national security reasons. And because we are more stringent in applying controls to more items than are our CoCom allies, the U.S. exporter is at a significant competitive disadvantage. In Europe especially, efforts are being made to "de-Americanize"—to design around or find alternative sources to U.S. parts, components, and equipment. The flaws in the control regime that drew the attention of the current administration when it entered office were real and its efforts have brought about needed improvements. But they have over-corrected and neglected the need to balance both military security and economic vitality.

Mr. Chairman, I have discussed only a few of the issues that deserve the Subcommittee's attention. Rather than prolong my statement, however, let me offer the Academies' assistance as you proceed with your investigation. In particular, we are in the process of compiling the most recent reports of my institution bearing on the issue of competitiveness. We shall be pleased to make that document available to you as soon as it is completed.

Senator BINGAMAN. Thank you very much.

Dr. Kerber, why do you not go ahead.

STATEMENT OF DR. RONALD KERBER, DEPARTMENT OF DEFENSE ACCOMPANIED BY DR. LOUIS M. CAMERON, ARMY DIRECTOR, RESEARCH AND TECHNOLOGY; REAR ADM. J.B. MOONEY, JR., CHIEF OF NAVAL RESEARCH; AND DR. BERNARD H. PAIEWONSKY, DEPUTY FOR ADVANCED TECHNOLOGY, U.S. AIR FORCE

Dr. KERBER. Thank you, Mr. Chairman.

I am pleased to appear before you today to present the DOD science and technology program. I have with me representatives of the services who can answer questions you may have in their specific areas of responsibility. These witnesses are: Dr. Louis M. Cameron, Army Director, Research and Technology; Rear Adm. J.B. Mooney, Jr., Chief of Naval Research; and Dr. Bernard H. Paiewonski, Deputy for Advanced Technology, U.S. Air Force.

I have a prepared statement for the record and, with the committee's permission, I will summarize that statement in my opening remarks and address several topics of interest to the committee.

As you are well aware, technology plays a dominant role in our military strength and in our national security strategy. Foremost among military requirements is the need for superior equipment to provide an edge for our forces over a range of combat situations and environments. We must have technical options available to us if we are to develop superior equipment.

It is the task of the science and technology program to provide these options and to serve as the foundation of the acquisition process. Through research, exploratory development, and advanced technology development the Department acquires the knowledge and know-how to give our personnel the tools to achieve military objectives.

Thus, the first objective of the science and technology program is to provide technical capability.

The second important consideration in developing technical options is affordability. Technology can make equipment and processes more affordable and thus more available. Many materials, electronics, computer software, and other service programs have as a primary consideration not whether it can or cannot be done, but whether it can be done in an affordable manner. We plan to move strongly in the direction of affordability.

A third consideration is the exploitations of technologies that have a potential for use in an increasingly competitive strategy. A competitive strategy exploits our technical strengths, and that way the Soviets are forced to expend resources in areas where the United States is strong, as opposed to the United States constantly responding to the Soviet-defined threat, a strategy which by itself can at best achieve parity.

Now I would like to highlight some specific science and technology programs. Since World War II, the DOD has relied to a large extent on the Nation's universities, both to conduct the basic research that underpins our defense technologies and to train scientists and engineers that we need.

In fiscal year 1986, the university research initiative, or U-R-I, was launched to further increase the DOD investment in the university research community. The URI increases emphasis on multidisciplinary activity within the DOD research program.

Such research activity draws together scientists and engineers from various disciplines, bringing complementary perspectives to bear upon national security objectives. This stimulates new ideas and promotes innovation.

URI or the university research initiative awards also include funding for research instrumentation and graduate fellowships. We need to encourage U.S. citizens to pursue advanced studies in science and engineering. We have given URI management emphasis and will continue to do so in the future.

Moving to integrated circuit programs, significant progress has been achieved in the last year. The very high speed integrated circuit, or VHSIC program has conducted three insertion demonstrations in major systems. Good progress has been made in the manufacturing technology portion of the program.

Three contractors have delivered test chips on the half-micron program. With the completion of the VHSIC program in 1989, DOD will have significant additional capability to meet military digital signal processing needs and, moreover, this new capability will be affordable.

We plan to make similar efforts for analog circuits oriented toward sensors.

The microwave millimeter wave monolithic integrated circuit, or MIMIC program has been launched and contracts have been awarded for the concept definition phase of that program. When completed, this program will give the Department an affordable capability in microwave millimeter wave integrated circuits that will also reduce system weight and increase reliability.

Moving to another initiative, excellent progress has been made in aircraft propulsion technologies. In the gas turbine area, the tri-service integrated high performance turbine engine program has been launched with the objective of major achievements by the turn of the century.

Among the goals is a 100 percent increase in the thrust to weight ratio and a 50 percent decrease in fuel consumption for fighter aircraft. Similar improvements are anticipated for rotary aircraft engines.

This coordinated service-NASA-industry program is important to all services. There are significant military advantages to be gained from superior propulsion. Beyond unique military payoffs, successful execution of the program will ensure dominance of the United States in both military and commercial gas turbine engines.

In another area of particular interest to the committee, conventional weapons are receiving special attention within the Department. A special management group with representatives from the services, the Joint Chiefs of Staff, SDI, DARPA, and the Office of the Secretary of Defense is determining technologies to be explored with conventional defense initiative or balanced technology initiative funds, as they are sometimes called.

These funds were appropriated in fiscal year 1987. We have established a thorough and rigorous evaluation process to ensure that funds are concentrated in areas that show the greatest promise for enhancing conventional capabilities. The planning process is near completion and a report will be provided to Congress in the next several weeks.

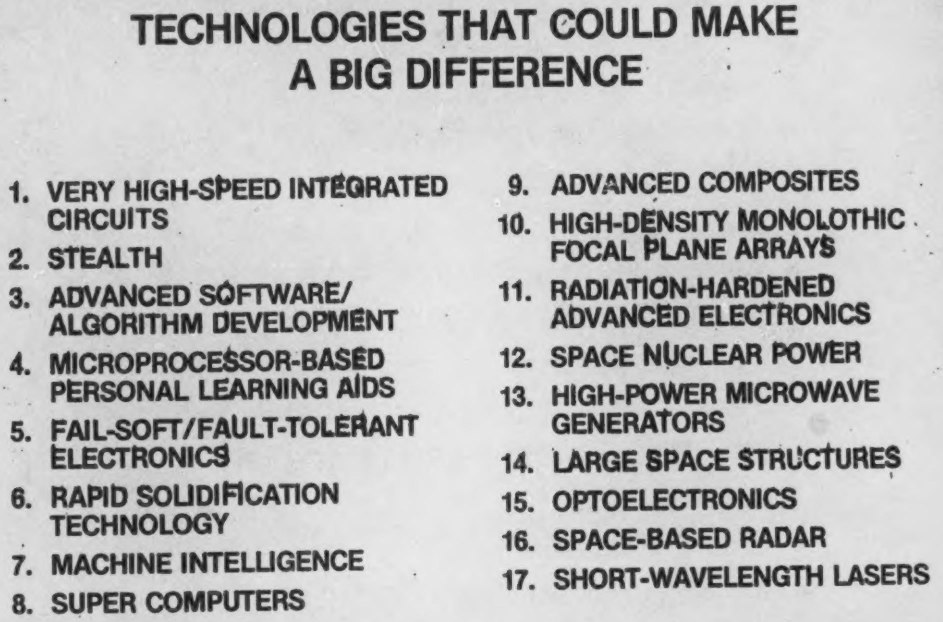
We in the science and technology community will continue to work toward strengthening conventional defense capabilities. The Nation's defense posture depends upon the possession of superior technology, and superior electronics is the keystone of many defense systems.

It is our perception that the United States semiconductor industry is losing its leadership in process and manufacturing technology, as well as in product design and innovation. This trend was recently confirmed by a Defense Science Board task force, which also cited the severe implications for national defense.

Increased U.S. dependence on foreign sources for critical semiconductor devices is unwise, both from the military and civilian viewpoint. The fiscal year 1988–1989 request includes an initiative in semiconductor technology. This initiative will focus on technologies to improve the manufacturing capabilities of domestic semiconductor producers.

We are currently working with other Departments and industry to best determine a course of action that will let the industry help itself to international leadership. Semiconductors have in the past played a pervasive role in our society. They will be an even greater factor in future equipment and systems. It is critical that we move ahead together with this new initiative.

If I may have the first chart.



TECHNOLOGIES THAT COULD MAKE A BIG DIFFERENCE

1. VERY HIGH-SPEED INTEGRATED CIRCUITS
2. STEALTH
3. ADVANCED SOFTWARE/ ALGORITHM DEVELOPMENT
4. MICROPROCESSOR-BASED PERSONAL LEARNING AIDS
5. FAIL-SOFT/FAULT-TOLERANT ELECTRONICS
6. RAPID SOLIDIFICATION TECHNOLOGY
7. MACHINE INTELLIGENCE
8. SUPER COMPUTERS
9. ADVANCED COMPOSITES
10. HIGH-DENSITY MONOLOTHIC FOCAL PLANE ARRAYS
11. RADIATION-HARDENED ADVANCED ELECTRONICS
12. SPACE NUCLEAR POWER
13. HIGH-POWER MICROWAVE GENERATORS
14. LARGE SPACE STRUCTURES
15. OPTOELECTRONICS
16. SPACE-BASED RADAR
17. SHORT-WAVELENGTH LASERS

You will see on this chart a Defense Science Board task force study that identified, in 1981, 17 technologies that could make a big difference for national defense. A number of these technologies depend upon semiconductor electronics, materials, laser and radiation science, and computers.

One can see a direct parallel between the broad areas identified by the Defense Science Board on this first chart and the areas on the second chart.

FUTURE TRENDS -- TECHNOLOGY RELATED

- VHSIC
- FOCAL PLANE ARRAYS
- UNCOOLED DETECTORS
- MMW SEEKERS/SENSORS
- MULTI-MODE/MULTI-COLOR SEEKERS
- FIBER OPTICS
- ADVANCED ALGORITHMS PROCESSING
- ADVANCED WARHEAD CONCEPTS
    - AIMABLE
    - EXPLOSIVELY FORMED PENETRATOR
- DIRECTED ENERGY/HIGH POWER MW
- MATERIALS
- LOW OBSERVABLES
- PASSIVE SENSING AND DETECTION
- SATELLITE NAVIGATION SYSTEMS

These are areas within the science and technology program identified by the tactical technology user community as areas where they now see a great opportunity for future impact. We must remember that coordination of the science and technology program with the tactical, strategic, and C-3 programs is critical to give us the technology that we need for a future system.

It is a goal of our office to aggressively provide that coordination, as well as coordination within the science and technology program.

If I may have the third chart.

SCIENCE AND TECHNOLOGY PROGRAM
(DOLLARS IN MILLIONS)*

	FY 1986		FY 1987		FY 1988		FY 1989
RESEARCH	954		892		918		986
(% REAL GROWTH)		(-10%)		(-1%)		(4%)	
EXPLORATORY DEVELOPMENT	2,279		2,342		2,503		2,658
(% REAL GROWTH)		(-1%)		(3%)		(3%)	
ADVANCED TECHNOLOGY DEVELOPMENT	1,405		1,707		1,964		2,223
(% REAL GROWTH)		(18%)		(11%)		(10%)	
TOTAL SCIENCE AND TECHNOLOGY	4,638		4,941		5,385		5,867
(% REAL GROWTH)		(3%)		(5%)		(5%)	

* Total for DOD including Military Departments and Defense agencies

STRATEGIC DEFENSE INITIATIVE	2,662		3,724		5,199		6,255
(% REAL GROWTH)		(35%)		(35%)		(16%)	

The science and technology program request for fiscal year 1988 is $5.4 billion, and for fiscal year 1989 it is $5.9 billion. This includes Army, Navy, Air Force, and defense agency amounts. Real growth in the science and technology program is about 5 percent in each of the 2 years of the budget request.

Your strong support of this budget is required for us to maintain a technological edge. I am sure that I need not remind you that technology is a perishable commodity.

In summary, I hope I have conveyed to you that the science and technology program is an essential part of the acquisition process. It is the foundation for developing superior equipment that will enhance our future military capabilities.

We plan to continue to select and pursue technologies that will be the basis for competitive and affordable national defense strategies. In recognition of the value of the science and technology program, we work hard to ensure that it is well managed and that it meets the needs of the services and defense agencies in their quest for national security objectives.

I appreciate the opportunity to appear before this committee. I will be happy to answer any questions you may have.

[The prepared statement of Dr. Kerber follows:]

PREPARED STATEMENT OF DR. RONALD L. KERBER, THE DEPUTY UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ADVANCED TECHNOLOGY

Mr. Chairman and Members of the Committee:

I. INTRODUCTION

I am pleased to testify in support of the Department of Defense (DOD) Science and Technology (S&T) program for FY 1988 and FY 1989.

Technology and innovation play a major role in almost every aspect of our society. Regardless of your profession, or where you live or what you do, the probability is high that things are different now because of the inroads made by the application of new technologies to the everyday life of the country. Computer processing is used to control inventories and tally your supermarket bill, long distance telephoning is routine and the miracles of modern medicine are readily available. And so it is with national security, technology change plays a dominant role in the military strength of the country and the strategies it can pursue.

A strong military is a combination of national resolve, industrial capability, morale, leadership, training and other ingredients. However, foremost among military requirements is the need for superior equipment that can provide an "edge" over a range of combat situations and environments. Fundamental to acquiring this equipment is the availability of technical options that can be the basis for developing increasingly superior systems. It is the task of the S&T program to provide future options.

The S&T program is the underpinning of the acquisition process. The research, exploratory development and advanced technology development programs making up the S&T program are the vehicles by which the Department acquires knowledge and know-how needed to give our personnel and our forces superior tools to achieve military goals and objectives. The DOD acquisition process will continue to need and support a strong and viable S&T program to ensure the timely availability of military technologies critical to the long-term national well-being.

The technology advantages we possess today over potential adversaries are only temporary. Just as many of the computers used today will be obsolete in a few years, so it is with military equipment. Large Soviet military investments do not permit relaxation of U.S. technology efforts.

The Soviets have long since realized that the communist ideology will not be a force for change in the future. They are now using military power to influence international events. The Soviets are willing to invest large amounts of national resources for new technologies and sophisticated systems for the projection of influence into various regions of the world. Our national challenge is to develop, in a timely manner, capabilities needed to maintain a believable deterrent and to prevent adverse technological surprise.

In addition to weighing increased capabilities that technology provides, it is equally important that affordability of the products produced by technology be considered. One of the great benefits of technology is that, if properly selected, it makes equipment and processes more affordable and thus more available. We are all familiar with the five dollar integrated circuit calculator that performs much better than costly mechanical devices of a few decades past. Affordability must be a prime consideration in the selection and undertaking of S&T projects. Efforts such as the Very High Speed Integrated Circuits (VHSIC), Microwave/Millimeter Wave Monolithic Integrated Circuits (MIMIC) and the Software Technology for Adaptable, Reliable Systems (STARS) programs all have as a primary consideration not that it can or cannot be done but can it be done in an affordable manner. The VHSIC, MIMIC and STARS and other Service programs are providing high performance affordable components that in turn make possible the design and production of equipment with greater capabilities without sacrificing cost, reliability and supportability principles. We plan to move strongly in this direction.

The S&T program meets this challenge by using both the public and private sectors to produce the technological know-how required for the development of superior equipment. The program covers technologies of importance to national security and employs the facilities and skills of industry, the university community and government laboratories to achieve the Department's technical goals.

An important aspect of the S&T program is the exploitation of those technologies that have high potential for use in an increasingly competitive strategy vis-a-vis the Soviet Union. A competitive strategy exploits our technical strengths so that the Soviets are forced to expend resources in areas where the U.S. is strong as opposed to the U.S. responding to Soviet defined threats. Among the technologies of particular importance to achieving and maintaining a competitive advantage are stealth and counter-stealth, computers and software, materials, lasers, communications, solid state electronics, propulsion, biotechnology, sensors and artificial intelligence. Successful pursuit of these promising technologies will increase the deterrent value of our forces and strengthen the hedge against adverse technological surprise. America must have strong military capabilities in the immediate future and over the long term. A competitive strategy approach to building those capabilities will allow us to meet our national security objectives with increasing efficiency and effectiveness.

The S&T program request for fiscal year 1988 is $5,385 million and for fiscal year 1989 it is $5,867 million which includes the Army, Navy, Air Force and Defense Agencies amounts less the Strategic Defense Initiative (SDI). Table I is a summary of fiscal year 1988 and fiscal year 1989 amounts. The S&T program encompasses the SDI program in the Advanced Technology Development category; however, this will be covered in separate testimony. The SDI amounts in table I are for informational purposes.

TABLE I
SCIENCE AND TECHNOLOGY PROGRAM
(Dollars in Millions)

	FY 1987	FY 1988	FY 1989
Research			
Military Departments..............	795	807	861
Defense Agencies..................	96	112	126
Total Research................	892	918	986
Exploratory Development			
Military Departments..............	1,620	1,690	1,761
Defense Agencies..................	722	813	898
Total Exploratory Development	2,342	2,503	2,658
Advanced Technology Development			
Military Departments..............	1,190	1,589	1,774
Defense Agencies..................	517	376	451
Total Advanced Technology..... Development	1,707	1,964	2,225
TOTAL SCIENCE AND TECHNOLOGY..........	4,941	5,385	5,867
Strategic Defense Initiative..........	3,724	5,199	6,255

Notes: Numbers may not add due to rounding.

The S&T program is an essential part of the acquisition process because it provides the technical foundation for developing equipment and systems needed by the military forces. The DoD will continue to support the S&T program to ensure that, even in the face of changing international situations, there will be a range of affordable technical options available to meet national security goals.

II. MANAGEMENT ACTIONS

This section discusses S&T program related activity with emphasis on organizational relationships, management approaches and supporting activities.

A. DOD-University Relations and the University Research Initiative

Since World War II, DoD has relied principally on the nation's universities to conduct basic research that has underpinned many national defense innovations. For the past several years, DoD has been strengthening its relationship with the nation's universities. A useful vehicle for accomplishing this has been the DoD-University Forum which is established as a federal advisory committee and provides advice to the Department on research and education-related matters.

This year the Forum assisted in the development of a document providing guidance on export control laws as they pertain to academic institutions. This document, to be sent to major research institutions, also contains information on protection provided for research results and points-of-contact in agencies for additional information. Also, the Forum has assisted in development of a concept to support a need for better capabilities in foreign language and area studies. The report is now being reviewed throughout the academic community. Finally, the Forum played a key role in advising the Department on the direction and approach to take in the development of the University Research Initiative (URI).

The URI increases emphasis on multidisciplinary activity in DoD research programs. While single-investigator, single-discipline efforts continue to comprise the major portion of DoD research activity, the URI focus is on advancing research in many disciplines simultaneously to accelerate progress in such technologies as advanced propulsion, mathematical analysis, oceanography, ocean remote sensing, materials, electro-optic systems, biotechnology and high-frequency microelectronics. Programs were also initiated in manufacturing technologies, artificial intelligence, robotics and computers.

This approach enables scientists and engineers from various disciplines to bring complementary perspectives to bear on national security objectives thereby stimulating ideas and promoting innovation. This collaboration should accelerate the process by which scientific discoveries are translated into practical applications for advanced defense systems, as well as for commercial spinoffs.

URI contract awards also include funding for research instrumentation and for graduate fellowships to encourage U.S. citizens to pursue advanced studies in science and engineering. Other URI programs support young investigators and exchanges of scientists and engineers between universities and DOD laboratories.

B. Semiconductor Manufacturing Initiative

The United States' semiconductor industry is losing the commercial and technical leadership it has historically held in process and manufacturing technology as well as product design and innovation. This trend has serious implications because the nation's defense posture depends upon the possession of superior technology, and superior electronics is the keystone of many technology advances. U.S. dependence on foreign sources for such an essential product is not a prudent course to follow, either from a military or private sector viewpoint.

The fiscal year 1988 program contains the Semiconductor Manufacturing Technology Initiative which will focus on technologies to improve the manufacturing capabilities of domestic semiconductor producers who supply devices for DOD weapon systems. The initiative will stimulate the semiconductor industry to develop advanced semiconductor materials, processing equipment and manufacturing methods necessary to maintain a viable and competitive domestic source for semiconductors and integrated circuits that have, in the past, played a pervasive role in our society and will be an even more significant factor in future equipment and systems. It is essential that the U.S. continue a position of leadership in this technology.

C. Independent Research and Development (IR&D)

Independent Research and Development is that portion of a company's research and development activity that is company-initiated and company-funded. It is distinguished from other effort which is performed by contract or other arrangements. Both DOD and NASA recognize IR&D as an important factor in accomplishing research and development (R&D) of concern to national defense, the exploitation of space and the development of technology that permits industry to compete in world markets.

IR&D costs are recognized as a necessary element of doing business in a high technology environment, and Federal Acquisition Regulations (FAR) provide detailed cost principles governing contractor recovery of IR&D costs. It is important to note that IR&D is not an effort contracted for by the government. Instead, a company's self-sponsored IR&D is spread over all company contracts and then each customer, whether civilian or military, pays a share of this indirect cost. Of the expenses contractors attribute to defense IR&D, DOD reimburses only 40% and the government gains access to and use of all IR&D performed by DOD contractors. The law and FAR cost principles provide that DOD reimbursement of the IR&D may not in any case exceed the dollar amount of projects deemed to have a potential military relationship.

We are continuing to work with industry associations to improve and streamline DOD's administration and oversight of IR&D without imposing cumbersome constraints. A data base is being developed to allow more effective assignment of annual project descriptions to DOD laboratories for review. This will diminish the volume and cost of the submission and, by using electronic means, it will increase the speed of annual reviews.

D. Domestic Technology Transfer

National security depends upon both military strength and economic strength. While the principal objective of DOD's S&T program is to strengthen U.S. military forces through superior technology, many scientific discoveries have potential for generating commercial products or processes that can enhance the competitiveness of U.S. industry. If the Nation is to derive the maximum return on DOD's investment in research and development, it is important to encourage domestic technology transfer. DOD laboratories have made technical advances that have had significant impact on the private sector. For example, defense R&D programs have resulted in recent commercial applications such as lithium batteries, improved permanent magnet materials, and the ring laser gyroscope.

The Federal Technology Transfer Act of 1986 increases the potential for greater contribution by DOD to both the public and private sectors. The Act authorizes DOD to enter into cooperative R&D agreements with state and local governments, universities and industry. This approach can provide dual dividends with the defense laboratories encouraging technology transfer to the private sector and at the same time benefiting from the infusion of university and industrial know-how. The Act also institutes achievement awards for scientists and engineers. It permits the Department to share royalties with personnel whose inventions are commercialized and to establish a more general program of cash incentive awards for all scientists, engineers and inventors, including those whose contributions benefit military applications but produce no royalties. We are acting expeditiously to implement the Act.

E. National Aerospace Plane Management

The National Aerospace Plane (NASP) program is a joint NASA/DOD research effort oriented toward a new family of aerospace vehicles. Conceptually, a future aerospace plane would operate as an aircraft at hypersonic velocities in the upper atmosphere, or as a space transportation system by accelerating directly into orbit. The impact on both aeronautical and space operations would be significant.

The program originally included funding from all interested agencies (Air Force, Navy, DARPA, NASA, and SDIO). However, the fiscal year 1987 Appropriation consolidated DOD funds in DARPA and SDIO. In the interest of better management, the Department has placed all DOD NASP funds for fiscal year 1988 and beyond in Air Force accounts. Overall NASP program management is accomplished through a steering committee chaired by the Under Secretary of Defense for Acquisition, with membership comprised of senior representatives from each of the five interested agencies. I serve as Executive Secretary to the Steering Group.

The program is structured in three phases. The first phase, to explore basic feasibility of the concept, was conducted by DARPA and has been completed. Phase II is currently underway and is oriented toward developing the technology in support of a decision to proceed to Phase III, the building and testing of a research demonstration vehicle. A Memorandum of Understanding has been signed by the Secretary of Defense and the Administrator of NASA for joint execution of Phases II and III.

The NASP concept centers on a hydrogen-fueled aircraft capable of horizontal takeoff and landing, and operating at speeds between Mach 5 and Mach 25 at altitudes of between 100,000 and 350,000 feet. Five airframe and two engine contractors are conducting concept definition studies directed toward defining the most promising concepts and identifying critical technology needs. Phase II is scheduled to be completed at the end of fiscal year 1989.

F. Scientific and Technical Information

Productivity of the S&T program depends to a great extent on the effectiveness of the DOD Scientific and Technical Information program. It is here that summaries of new efforts are collected for use by technical managers to take advantage of work being accomplished elsewhere, and it is here that comprehensive reports of completed technical efforts are collected and disseminated to researchers and developers. Also, information about IR&D efforts of defense contractors is provided to government planners to make the technical efforts of government and industry complementary. These support services are essential for efficient and effective R&D management.

Technical information activities are carried out primarily by the Defense Technical Information Center (DTIC), Information for Industry Offices (IFIOs) and specialized Information Analysis Centers (IACs). DTIC is DOD's central activity for collecting, storing and disseminating information on planned, ongoing and completed R&D. It provides a range of information services, including an extensive telecommunications network for defense organizations and contractors to review DTIC holdings and order information electronically. Current activities include the establishment of a gateway computer system that allows DTIC users to access and retrieve data from numerous government and commercial databases with a single command protocol and increased emphasis on maintaining current and complete coverage of defense research activities. New procedures are being implemented to increase the availability of technical information within the defense community, while at the same time protecting it from unwanted access by potential adversaries.

The Information for Industry Offices permit industry access to information on DOD acquisitions, R&D requirements, science and engineering objectives, and other planning documents relevant to the R&D capabilities of their respective organizations. The IFIOs have been most useful to contractors in planning their IR&D programs. Information Analysis Centers collect, review, analyze, summarize and provide advisory services in well-defined and specialized technical fields. Their work is distinguished from documentation centers and libraries by their concern with the technical content of information they collect rather than simply with the acquisition and dissemination of documents. The demand for these services continues to increase and we are seeking to improve the quantity and quality of the outputs and still keep the services within affordable limits.

G. Conventional Defense Initiative

The Conventional Defense Initiative (CDI) has received special management attention in order to maximize benefits from the FY 1987 amounts appropriated. To determine uses for the funds not already allocated by Congress, a planning group has been formed to develop a CDI program that both meets the intent of Congress and provides for a significant increase in conventional capabilties. The planning group is comprised of OSD, SDIO, DARPA and JCS staff members. In addition, the Services and Defense Agencies provided project nominations and priorities that they considered to have met the criteria established for CDI projects. A rigorous evaluation has been employed and, even though a large number of nominations were made, the final selection will concentrate funding into a relatively few areas that show the greatest promise of innovative concepts and methods for enhancing conventional capabilities. The planning process is nearing completion and a report will be submitted to Congress in the next several weeks. We in the S&T community will continue to work toward strengthening the conventional capabilities of the country.

H. Scientific and Technical Management

Science and technology program management continues to receive special attention because of its importance to the acquisition process. Opportunities for joint programs will be explored and program coordination will continue to have high priority. Both routine and special Service reviews will be held to ensure that S&T programs selected are of high quality and meet military needs. In addition, the Defense Science Board has been tasked to perform a review, during its summer session, of the S&T program management structure including management of DOD laboratories with the objective of developing recommendations to make more effective use of the resources (personnel, facilities and funds) in the S&T program.

III. SELECTED 1988 AND 1989 TECHNICAL PROGRAMS

The S&T program has produced a number of very important advances such as smart weapons, night vision, advanced electronics, new materials and a host of items that make up the guns, ships, aircraft, vehicles and equipment used by the armed forces. The number of projects within the S&T program is very large and diverse and it is not possible to discuss all of them in this statement. Instead, representative ongoing activities will be described:

A. Research

Within the DOD Research (6.1) program emphasis is placed on the discovery of new phenomena and on the exploration of the potential of such phenomena for military applications. Whereas some of the discoveries find almost immediate application, the general outlook for the Research program is long-term. The work is performed by universities, industry, and government laboratories, with approximately one-half being performed by universities. The goal is to assure a position of technological leadership for the future. Examples of areas in which significant progress is being achieved are:

Quantum-Size-Effect Electronics: The progression to smaller and smaller microelectronic structures is receiving important emphasis, because such structures offer advantages in speed, efficiency, volume, and weight. Future generation microelectronic chips will involve structures some ten times smaller than those employed in the VHSIC program. This is the size regime first investigated under the Ultra Submicron Electronics Research (USER) program. In this size regime, it will no longer be possible to scale down existing electronic devices to smaller sizes but rather, it will be necessary to create new devices that take advantage of quantum-size-effect phenomena. Emphasis is directed toward discovering and characterizing such phenomena, developing electronic device concepts which capitalize on these phenomena, and exploring effective approaches to the fabrication of such small structures.

Cooled and Trapped Atoms: Atomic clocks provide the time base for satellite navigation systems and for sophisticated communications systems. The accuracy of an atomic clock is limited by the ability to slow down the thermal motions of the atoms which serve as the frequency standards, and hence time standards, in the clock. Currently under study are novel approaches to slowing down, or cooling, atoms and trapping them. The laser, which in other applications can be used to heat, weld, and cut metal, can be used to slow down or refrigerate atoms to temperatures within a fraction of a degree of absolute zero. This approach shows promise of highly accurate atomic clocks and hence improved navigation and communications systems.

Systolic Arrays: Future defense systems require increased signal processing capabilities that cannot be provided by traditional serial architectures. New approaches receiving emphasis include "systolic arrays," that are capable of processing a multitude of data streams in parallel. Recent progress includes the development of algorithms for the automatic design of systolic arrays to execute specific signal processing tasks. Processing speed enhancements as great as a factor of 1,000 appear feasible. First generation applications have transitioned to Exploratory Development and are likely to culminate in systems for acoustic detection of submarines and in "vision" processing for the autonomous land vehicle.

Ultra-Low-Loss Fiber Optics: Optical fibers have widespread application in both commercial and military systems. The signal attenuation in silica glasses is such that the signal must be boosted by a repeater every 30 miles. Research is being directed toward fluoride glasses for which the theoretical limit approaches 1,000 miles. Although the presence of undesirable impurities has thus far precluded attainment of 1,000-mile attenuation lengths, progress has been made through highly sophisticated chemical processing. Repeaterless transmission over hundreds of miles would have great impact on both antisubmarine warfare and communications.

Diamond Film Growth: Diamond as a semiconductor material has the potential for surpassing silicon in some important respects, provided problems of availability and producibility can be overcome. Recent progress has led to the development of a plasma deposition technique for growing diamond films that is both affordable and versatile. While it is too early to evaluate the full implications of these results, there are near-term potential applications including diamond-coated cutting tools, diamond-coated computer hard disks and read/write disk heads.

In addition to the above examples, the Research program includes investigations in the mathematical, physical, engineering, environmental, and biological sciences all of which provide a basis for follow-on Exploratory and Advanced Technology Developments.

B. Integrated Circuits and Electron Devices

Significant accomplishments were achieved in the Very High Speed Integrated Circuit (VHSIC) program that makes available advanced digital integrated circuits for defense systems. Three successful demonstrations were conducted in operational environments. VHSIC chips were used to upgrade the performance of the Air Force's AN/ALQ–131 electronic warfare pod, the Navy's AN/UYS–1 signal processor and the Army's Enhanced Position Locating Reporting System. Potential cost saving in the latter system exceeds fifty percent of the VHSIC program's cost. Manufacturing process improvements have increased chip yields from below 1% to 20% and for a memory chip with over 400,000 transistors to more than 80%. Four fabrication lines have been certified to produce military qualified VHSIC chips. The throughput of electron beam lithography equipment, developed under the VHSIC effort, is four times that available elsewhere. Finally, three contractors have delivered test chips that meet the one-half micrometer feature size requirement. Devices with these characteristics will lead to a 100-to-1 performance improvement over chips with current circuit densities.

The Microwave/Millimeter Wave Monolithic Integrated Circuits (MIMIC) program is underway. It is oriented toward major improvements in analog sensors, the "eyes and ears" of electronic systems, similar to the benefits that VHSIC will provide for the processors or "brains" of these systems. MIMIC's objective is to demonstrate affordable applications in aircraft, missiles, surveillance and other applications. Potential uses include phased array antennas, electronic warfare devices, communications equipment, and seekers for smart weapons. MIMIC will develop state-of-the-art analog integrated circuits using gallium arsenide processes, computer-aided design and technology demonstrations. A key goal of the program is to make MIMIC devices available to all DOD contractors.

C. Aircraft

Air power is of great importance to the United States if it is to maintain a realistic and viable defense posture. The DOD aircraft technology program continues to emphasize technological superiority of U.S. aircraft with forethought to affordability, supportability and responsiveness. The S&T program is responding to the challenge by transitioning high-payoff laboratory-developed technology to application via large scale demonstrations with focused attention on subsystem integration.

Two major demonstration programs will be completed this year, the Mission Adaptive Wing and the Advanced Maneuvering Attack System (AMAS). The Mission Adaptive Wing program in cooperation with NASA, flight tested a modified F-111 aircraft with a smooth-contour, variable camber wing. The shape of the wing is reconfigured in flight to optimize aerodynamic performance for the specific mission segment being flown. The technology is potentially applicable to military aircraft from fighters to strategic bombers and transports. The second demonstration involves the AMAS. It is being flown on the F-16 Advanced Fighter Technology Integration aircraft, and will enable an attacker to deliver unguided weapons on a target without direct overflight providing a 2-to-1 increase in survivability with the same weapon delivery accuracy as current systems, and will increase the firing envelope in air-to-air combat. This effort provides increased insight into the concept of advanced tactical flight management for application to the Air Force Advanced Tactical Fighter (ATF).

Modification of an Air Force F-15 aircraft to demonstrate enhanced maneuvering capabilities and short takeoff and landing technologies is continuing. The technologies include two-dimensional thrust vectoring and reversing exhaust nozzles, an integrated flight and propulsion control system, advanced cockpit displays, an advanced high lift system and rough/soft field landing gears. The program will demonstrate improved combat maneuverability and effectiveness and the capability for operations from bomb-damaged or unprepared runways. The first flight is planned for early 1988. This technology will be available for transition into the ATF, as well as derivatives of present tactical aircraft.

The Army's Advanced Rotor/Control System program will develop a helicopter rotor system based on individual blade control, without the use of conventional swashplates and mechanical linkages. Significant improvements in survivability, reliability, maintainability and vibration suppression will be demonstrated in addition to vehicle performance with extended range, higher speed, higher payload and improved maneuverability.

The Air Force is addressing reliability and maintainability with its Self-Repairing Flight Control System program wherein artificial intelligence technology will be used to reduce maintenance costs and improve safety. In the latter regard, when a flight control component failure occurs, the flight control system will be automatically reconfigured using other control surfaces to maintain safe flight. A 1988 flight demonstration is planned with technology transitioning to the ATF as well as derivatives of other aircraft.

D. Integrated High Performance Turbine Engine Technology

In recognition of the continued high payoffs for aircraft propulsion technology, a major initiative, the Integrated High Performance Turbine Engine Technology (IHPTET) program has been launched. The goal is to demonstrate technology at the turn of the century that will double aeronautical propulsion capabilities for aircraft and missile applications. More specific goals include a 100 percent increase in thrust/weight ratio and a 50 percent decrease in fuel consumption for fighter/

attack aircraft engines. In addition, a 30 percent decrease in fuel consumption and a more than 100 percent increase in power/weight ratio for rotorcraft engines are program objectives.

The IHPTET program is a coordinated effort between the Army, Navy, Air Force, the Defense Advanced Research Projects Agency, the National Aeronautics and Space Administration, and industry. Innovative propulsion and materials technologies will be developed concurrently with improved gas-turbine structural arrangements. These technological advances, as available, will be demonstrated sequentially in advanced engine configurations in the 1990, 1995, and 2000 time periods in such a way as to permit both continued technology development and earlier transition to nearer-term system needs.

The potential payoffs in increased military capabilities and in increased civilian productivity are enormous. For example, achievement of the program goals would offer: (1) a sustained Mach 3+ capability in an aircraft the size of an F-15; (2) a 100 percent increase in the range/payload capability of a CH-47 sized helicopter; and (3) a supersonic V/STOL fighter the size of the F-15 with greater range/payload capability. Such payoffs can, of course, be taken in other ways by trading improved aircraft performance for reduced aircraft size and cost. Given that DOD aircraft-related expenditures are roughly $100 billion per year, it is important to maintain an engine performance advantage over potential adversaries, and the IHPTET program is intended to increase that advantage.

Beyond these uniquely military payoffs, successful execution of the IHPTET initiative will ensure continued civil and military dominance by the United States in aircraft gas-turbine engines.

E. *Conventional Weapons Technology*

Advanced weapon concepts for non-nuclear conflict are developed in the conventional weapons technology program. This includes small arms, guns, mines, missiles, projectiles, and torpedoes. Improvements are being made in range, accuracy, lethality, safety, and all weather fire and forget capabilities. These are vital ingredients for enhancing our conventional warfare posture.

Missile and rocket propulsion efforts have led to the development of a multiboost motor that optimizes energy management to increase missile range, trajectory shaping and maneuverability. This technology is being transitioned to the Short-Range Attack Missile program. Also, progress is being made toward reducing propellent and rocket motor hazards, without adversely affecting propulsion performance. This is accomplished by changes in the propellent and innovative rocket motor case design.

The Army is continuing development of the regenerative liquid propellent gun (RLPG) concept on a 155-mm self-propelled howitzer. RLPG technology applied to anti-armor, air defense and artillery applications has the potential to counter future threats, as well as providing cost and logistics improvements. The major advance in RLPG technology is the development of propellent injection techniques that are controlled by detonation rate. Improvements in liquid propellent formulation and seal designs are also being pursued.

Emphasis is being placed on reducing the number of Service unique weapons by the development of common components. The Hypervelocity Missile (HVM) for anti-armor applications is an example of this approach. HVM exploits advanced propulsion concepts to accelerate a kinetic energy penetrator to very high velocities and uses laser techniques for midcourse control and terminal homing. It is anticipated that the HVM will have, in addition to anti-armor uses, Air Force and Navy air defense applications.

A major thrust of the conventional weapons program is the improvement of sensor technology for target surveillance, acquisition and tracking, with emphasis on seeker developments for fire and forget weapons. A Defense Science Board study on image recognition systems is underway to assess this area and to provide recommended approaches that will foster the development of an autonomous target recognition capability. The goal now seems achievable in view of recent advances in both computer hardware and software that permit real time processing of large amounts of data. This technology will be included in the CDI and we are emphasizing multi-Service component commonality. The Dual Mode Terminally Guided Submunition is a joint Army/Air Force demonstration of a combined infrared and millimeter wave seeker with potential applications to the Army Tactical Missile System and the Multiple Launch Rocket System.

F. Chemical Defense

The Chemical Defense program addresses a serious national security problem, the threat of chemical weapons against U.S. personnel. The program is performed by the Services with the Army as executive agent under a joint-Service agreement. The program incorporates university and industrial resources to broaden the innovative base needed to solve this difficult problem. In addition, new technology is being explored for the safe and economical disposal of obsolete and unusable chemical munitions, a legislative requirement to be met by September 1994.

Examples of program progress include improved protective masks for personnel, medical equipment for casualties, antidote and pretreatment drugs and detection equipment. In addition to the defensive programs, relatively modest retaliatory developments are being undertaken to improve the nation's deterrent posture. Exploratory work is planned to develop more efficient and cost effective air delivered weapon techniques that can be adapted to modern delivery systems. Both the defensive and retaliatory projects underway provide the basis for a strong deterrent and if deterrence fails, a basis for survival and operation on the battlefield.

Other activities in the Chemical Defense program include technical support for arms control negotiations and studies to evaluate the feasibility of on-site treaty verification. A new chemical/biological defense Information Analysis Center has been established to provide a single source of information and to consolidate the chemical defense data base. The Foreign Weapons Evaluation program has been integrated into the review process to allow consideration and evaluation of Allied equipment for use by U.S. Forces. The Department will continue to emphasize chemical defense developments to ensure a credible deterrent posture and, if deterrence fails, to ensure that U.S. personnel will be able to survive and operate on a chemical battlefield.

G. Materials

The Materials program continues to exploit the advantages of composites. Two distinctly different phases of the program have evolved. Both organic matrix and metal-matrix composites have been transitioned to production, while carbon/carbon and ceramic matrix composites remain in R&D. The work on the ceramics will become an integral part of the Integrated High Performance Turbine Engine Technology program since they are an important candidate for the high temperature material required in the program.

Current efforts on organic matrix composites include the development of a composite turrent and hull using the Bradley vehicle as a model. The Air Force is extending the use of these composites to radar absorbing structures. Reinforced thermoplastics for aircraft structural components are being explored to achieve lower manufacturing costs. Field repair and non-destructive inspection and evaluation techniques are being examined as are the development and generation of uniform specifications, standards and test methods in support of reliability and maintenance needs. In addition, DARPA is exploring the feasibility of radio frequency and intelligent processing techniques to reduce the cost and improve the quality of organic composites.

Similarly, the Metal-Matrix Composites (MMC) program has important demonstrations underway. The Army is developing lightweight howitzer components, the Navy is working on missile components, and the Air Force is developing fighter aircraft tail structures. Two MMC items have transitioned into production. These are guidance components for the Trident missile and battery plates for Navy submarines. Both the Navy and Air Force are developing MMC components and structures to support traditional space missions, and the Strategic Defense Initiative (SDI) program draws on the technology to satisfy its needs.

With the advent of the National Aerospace Plane, the High Performance Turbine Engine, and the SDI program, it is necessary to reexamine technology in high temperature materials. To this end, a National Academy of Science/National Materials Advisory Board study has been commissioned to evaluate the overall U.S. posture and provide recommendations on future research and development directions.

H. Computers and Software

Most military systems are dependent upon computers and software to accomplish their missions. Within the computer sciences area, two of the most promising technologies are artificial intelligence and robotics. These technologies promise major gains in combat capability. Artificial intelligence will enable computers to perform tasks far more complex than the repetitive jobs at which they currently excel. Examples are autonomous vehicles for unmanned reconnaissance, systems to offload routine tasks from pilots, battle management assistants, and systems to guide repair personnel through maintenance of complex electronic equipment. All Services have programs to explore and demonstrate these technologies in their unique applications. The Services' programs are coordinated and interact regularly with DARPA's programs in artificial intelligence and strategic computing. The objective is to take advantage of the U.S. lead in computer and related technologies by inserting as rapidly as possible advances emerging from research into modern combat and support systems.

Computer software provides the means for executing complex tasks. The DOD Software Initiative seeks to improve the reliability of the software for warfighting systems and improve its cost effectiveness. The initiative has three components, the Ada standard programming language, the Software Technology for Adaptable, Reliable Systems, or STARS Program, and the DOD Software Engineering Institute (SEI).

The Ada program was established to develop and introduce into military systems a powerful computer programming language that satisfied the technical requirements imposed by difficult missions. The program is implementing comprehensive standardization, control and support for the language to ensure its smooth, swift and widespread introduction into defense systems. Ada is a Military Standard, a Federal Information Processing Standard and an American National Standards Institute Standard. It will become an international standard this year. It is in use in the United States as well as in Belgium, Canada, France, Germany, Israel, Italy, Japan, the Netherlands, Norway, Spain, Sweden, and the United Kingdom. NATO is committed to using Ada in its command and control, air defense and communications systems.

The use or planned use of Ada continues to expand and an Ada technology insertion initiative is included in the fiscal year 1988/89 request to stimulate further use of the language. Examples of large DOD systems currently under development with Ada include the Army Field Artillery Tactical Data System, the Advanced Tactical Fighter, and the Army Command and Control System. A NATO cooperative project, funded under the Nunn amendment and by nine other nations, is developing an Ada Programming Support Environment for use in developing software. In addition, productivity improvements have fostered the growth of commercial programs based on the language, such as the Boeing 7J7 prototype.

The STARS program seeks to achieve improvements in software quality and reduce software costs. Future weapon systems will rely on large quantities of software for their successful operation. STARS will demonstrate productivity improvements by using software engineering principles made possible by Ada. We will try to bring a high degree of automation to the software development and maintenance process, and make possible widespread reuse of already coded and tested software. The combination of software automation and reuse should reduce labor intensiveness, maximize the productivity of scarce software professionals and improve reliability in combat systems.

The DOD Software Engineering Institute (SEI) is working to accelerate the transition of software technology from the laboratory into DOD systems. The Institute, administered by the Air Force for DOD, is located at Carnegi-Mellon University. It serves as the DOD center of excellence for software engineering and will help transition technology more quickly to DOD applications by evaluating new tools and techniques, upgrading them for large systems, and demonstrating their usability in military situations. It will also provide software engineering assistance to developers in the Services and Defense Agencies. The SEI has developed evaluation criteria for Ada environments, has established relationships with other universities and industry and has conducted a rigorous analysis of software data rights. The Institute will continue to play an important role in the development and use of DOD software.

I. Sensors

Sensor systems requirements for air, land and sea missions are becoming very demanding as countermeasures and low observable technologies are developed. The acoustic and electromagnetic spectrum from infrasonic to visible wavelengths must be exploited to achieve effective target detection, localization and identification. In addition, multi-sensor integration must be developed to provide robust countermeasures and to decrease false alarms in scenarios where the target signals are in complex clutter backgrounds. Sensor and component developments are discussed below:

Underwater Search: Systems employing both active and passive acoustic technologies are being developed to maintain our current advantage over increasingly sophisticated and quieter submarines. These systems incorporate advanced signal processing techniques to meet difficult computational and data fusion requirements. Low cost fiber-optic components and sonobuoys are being introduced to improve affordability. In addition, non-acoustic technologies such as magnetic and optical sensors are also being developed to complement more traditional means of detection.

All-Weather Operations: Combination of active and passive sensor devices for night and inclement weather search and surveillance are in advanced development. Active systems include coherent laser radar and millimeter wave radar devices. Passive systems include acoustic devices, thermal imaging and infrared search and track systems. Techniques to harden infrared and electro-optics devices against countermeasures and to reduce life cycle costs are being developed. In addition, eye-safe carbon dioxide laser rangefinders and target designators are under development to operate with thermal imaging systems to provide an extremely accurate weapon delivery capability. U.S. soldiers will be equipped for the world's best night and all-weather fighting capability.

Ocean, Land and Aerospace Surveillance: Infrared sensors and frequency agile radar systems with long-range search capabilities and high resolution target tracking abilities are being developed to locate targets. Radars with the transmitters and receivers at separate locations can use advanced bi-static signal processing to detect low cross-section targets. The development of affordable flush mounted solid state phased array transmit/receive modules for military platforms is proceeding well. These conformal phased array radars will eliminate cumbersome rotating antennas presently on many ships and aircraft.

J. Medical Research and Development

The objectives of the Medical and Life Sciences program are to improve combat casualty care, to prevent diseases and injuries, to maintain personnel effectiveness in combat, and to improve human safety in military systems. The Armed Services Biomedical Research Evaluation and Management Committee (ASBREM) continues to play a central role in formulating and coordinating the Services' medical R&D program. The ASBREM has proved to be an effective management mechanism.

The medical program addresses both basic and applied research unique to military operations. During the past year, a new technology for storing frozen red blood cells for periods up to 20 years has advanced sufficiently to seek Food and Drug Administration approval. A new type of concentrated resuscitation fluid was developed for treating battle casualties in shock. This fluid is logistically superior to older methods. An aircraft life support system for advanced aircraft was flight tested and the food and clothing program developed items required to better support the combat mission.

K. Survivability

United States reliance on "smart" weapons necessitates that we protect optics and electronics from a number of threats including tactical Directed Energy Weapons (DEW). Additionally, the widespread use of organic matrix composites and other "novel" materials requires that their susceptibility to DEW be determined and protective measures devised. To satisfy this need, a tactical survivability technology program has been initiated that provides for advanced technology development on optical switches/materials, power limiters and agile eye protection filters. In addition, a laser structural test program and increased efforts on antiradiation missile countermeasures will be undertaken. The program will expand on the technology base that has been built up over the past few years.

L. Training

Training for the military is preparing to win battles and wars, should they have to be fought. It is the major peacetime activity of both active and reserve forces. Computerized instructional systems, electroluminescent color displays, helmet-mounted displays, computer-generated imagery, and electronic networking are some of the advanced technologies being developed and applied to make military training more effective and affordable. Specific products include low-cost infantry marksmanship trainers, through hand-held interactive maintenance instructional devices and complex simulations for designers and battlefield commanders. Although the specific products are aimed at making military training better and more cost effective, the underlying technologies have the potential for being transitioned to the private sector as vehicles for boosting job skills.

M. Biotechnology

Biotechnology has been a significant technology development over the last ten years. The underlying principle is the ability to control (genetically) and direct microorganisms to produce large amounts of useful materials. This technology has potential for solving operational and logistical problems in DOD. Present activity is largely directed to medical matters such as the development of vaccines and prophylaxis and therapy related to infectious diseases, nerve agents and toxins. Recent research uses the recombinant DNA (rDNA) technique, one of the tools of biotechnology, to produce a malaria vaccine that is undergoing trials. A rDNA vaccine to protect against Rift Valley Fever is being tested.

At a lesser investment level, long-term non-medical basic research is underway that could be a precursor to novel applications in composite materials, marine adhesives, synthetic rubber, marine antifoulants, sensors, optical switches and other products. Recent accomplishments include the cloning of a marine adhesive gene, the production of a biomolecular negative resist film for microelectronics research, the development of monoclonal antibody-coated fiber optics for detection systems, and the fabrication of highly manipulatable, microscopic lipid biostructures that have potential applications in composites and electronics.

The biotechnology program coordination process is carried out by the DOD Biotechnology Steering Committee (DBSC) with representation from the three Services, DARPA, DIA, and DOD. The DBSC is also responsible for maintaining communication and program coordination with other federal agencies and for cognizance of federal regulatory affairs as they apply to the DOD program and its contractors.

N. Avionics/Navigation

Technology advancement in display techniques, decision aids and embedded computer systems is bringing to reality a single integrated system to replace numerous "black boxes" that control essential functions on aircraft, ships and tanks. Common, replaceable modules using advanced technology such as VHSIC are providing highly reliable and maintainable avionics and navigation systems. Three dimensional, panoramic, high brightness cockpit displays look very promising. Integrated avionics technology focusing on tactical battle management to optimize the use of radar, electronic warfare, electronic sensors, navigation systems and weaponry is being accelerated to insure transition into the ATF prior to full scale engineering development.

O. Environmental Science Support

Meteorology, oceanography, terrestrial science and space science are included in the Environmental Sciences program. This program is developing methodologies and equipment to optimize the performance of existing and emerging weapons systems. Because environmental situations can limit or even render inoperative many systems, it is important to incorporate environmental considerations in early design so that potentially adverse conditions can be avoided, mitigated, or exploited.

Recent work in environmental sciences has emphasized Arctic programs and oceanography. Efforts are underway to develop ice forecasting models to study under-ice acoustics and to investigate the mechanical and engineering properties of ice and permafrost. In oceanography, one of the single most challenging problems is the development of coupled, interactive atmosphere/ocean dynamic numerical models. When developed, these models will produce global weather forecasts, wave and swell forecasts and ocean circulation patterns used in undersea and anti-submarine warfare.

Both the Air Force and Navy employ state-of-the-art equipment for meteorological support and all services are developing improved capabilities for local environmental support using the latest in microcomputer technology. Proper understanding of the environment can be a significant combat advantage, and R&D programs are designed to provide this understanding to future commanders.

P. Logistics

An effective fighting force must have quality weapons systems that are available when needed, perform as intended and can be maintained at peak performance levels with an affordable logistics system. The services are addressing the logistic challenge with a number of efforts designed to improve sustainability, reduce cost and keep performance factors at peak levels. Among the efforts, the Army is exploiting technology to provide improved diagnostics for turbine powered aircraft and tank engines using expert computer systems. In addition, an electronic maintenance system is being explored that will talk a mechanic through trouble-shooting and repair procedures.

The Navy has demonstrated non-destructive testing of fiber optics connectors in operational systems and is applying advanced computer integrated manufacturing techniques to establish flexibility in the manufacturing of spare parts. The Air Force is emphasizing reliability, maintainability and testability in early design stages. Among the developments to achieve this goal are solid state active aperture radar arrays to make large improvements over existing airborne radars and the application of artificial intelligence for diagnostics and self repair. It is our goal to continue emphasis on logistics technology programs as a viable route to reducing costs and improving the defense posture.

IV. CONCLUSION

In conclusion, I hope I have conveyed to you an understanding that the S&T program is essential to DOD's posture and is particularly important in providing options that will serve as the foundation for future national strategies. A number of representative programs have been discussed that cover a range of technologies important to the DOD's mission. We plan to continue to select and pursue technologies that will be the basis for competitive and affordable strategies vis-a-vis the Soviets. In recognition of the value of the S&T program, we work hard to ensure it is well managed and meets the needs of the Services and Defense Agencies in their quest for national security goals.

Senator **BINGAMAN**. Thank you very much.

Let me just start with a few questions and then I will defer to Senator Wirth.

SEMICONDUCTORS

Dr. Graham, one of the items that you discussed in your testimony and I believe each of the other witnesses has discussed at least in passing is the initiative taken with regard to semiconductors.

Do you agree with the Defense Science Board approach, which I gather is essentially providing a Government subsidy to industrial prototype fabrication? They want to go forward with a very aggressive program in that area, if I understand what the Defense Science Board and the Semiconductor Industries Associations have proposed. Is that something you are in agreement with?

Dr. **GRAHAM**. No, Mr. Chairman, I do not favor subsidizing the semiconductor industry. At the same time, I believe there is a national security issue involved, and the Department of Defense may have to take measures to protect the production capability that it draws on.

I would hope, however, that the industry itself can work together, following the best examples of U.S. initiative and to some extent, where applicable, the best examples of foreign initiative, to become more competitive within its own capabilities.

At the same time, I think the Government does have a role in supporting the basic research which provides the broad foundations for the science and technology that is useful to the semiconductor industry and other industries, and I would like to make sure that the Government is carrying out as much activity as it reasonably can to provide that basic research so necessary to sustain our industrial capabilities.

TECHNOLOGY DEVELOPMENT INVESTMENT PROGRAMS

Senator **BINGAMAN**. You indicated in your testimony, Dr. Graham, that OSTP will examine the basic causes of the situation and investigate alternatives to Government subsidy and recommend appropriate measures for technology development investment programs to address the problem.

Can we expect some type of position from your office on what course should be followed on this, and if so when would that be expected?

Dr. GRAHAM. I have asked the White House Science Council to form a subgroup to address that issue, and Mr. Edward David, one of the predecessors of mine in the Office of Science and Technology Policy, has agreed to chair that subgroup.

It will have on it a small number of leading members of industry and academia to look at this question. I have asked them to proceed down a fast track, to not conduct a great deal of new and original investigation themselves, but to review the, I believe ample work that has been done by the Defense Science Board, by the National Science Foundation, and others, and try to come forward with a series of alternatives for me to consider.

I have asked them to do that, with the preliminary report by mid-April and a final report a month thereafter. I hope they will be able to stick to that schedule.

Senator BINGAMAN. Now addressing the other three witnesses, I gather each has indicated basic agreement with the Defense Science Board recommendation as it now stands. Is that accurate, Mr. Bloch? You were part of that.

Mr. BLOCH. Yes. I wanted to mention that I was part of that particular task force, and I certainly was in agreement with the recommendations of the task force.

BASIC KNOWLEDGE FOR INDUSTRY

I want to characterize the recommendations a little bit differently than supporting or subsidizing the industry. To me it was primarily that what the Defense Department should do, because of its high dependence on that particular technology, is make sure that that industry has the wherewithal to bring itself out of the problems it is in today.

The wherewithal, in my opinion again, is knowledge and people in this case, and particularly knowledge. There were five recommendations in all. And there were especially two recommendations that in my opinion are more important than the other three.

One is the establishment of a semiconductor manufacturing technology institute. The Department of Defense could contribute to this particular undertaking, not completely support it and fund it, but contribute to it so that new technologies can be developed which individual companies then can take, and do whatever they need to do.

And the second one, which is equally important or maybe even more important, is to establish, at eight universities, centers of excellence for semiconductor science and engineering. These centers would build upon centers of excellence that we have had in the past, to bring the right basic underpinnings to this particular industry.

So to me it was not supporting the industry or bailing out the industry, but giving it the wherewithal to bail itself out. They have to do a lot of things themselves, and I agree with Dr. Graham that we should not subsidize that industry in the sense of that word, but that we can help that industry essentially to get itself out of the slump that it is in through knowledge, through science, and through a better understanding of materials and equipment and everything else that goes with it.

Senator **Bingaman**. Would Dr. Kerber or Dr. Press like to comment on that?

Dr. **Kerber**. I would like to, yes.

Senator **Bingaman**. Go ahead.

Dr. **Kerber**. I tend to agree with the other witnesses in the sense that we do not view this as a subsidy but a need by the Department to have technology available. As you are well aware, we are looking for national defense to be underpinned by a technological edge. We need that technological edge.

Just a few facts. We buy 3 percent by parts count of the semiconductor manufacturing industry's products. We are a rather small procurer of semiconductor electronics.

However, we buy about 35 percent of our total research, development and procurement in that area of semiconductors and electronics. So we depend strongly on an industry that is driven primarily by the commercial sector.

If you looked at the recommendation of the Defense Science Board, they made two recommendations that have already been discussed. These are the idea of having support for semiconductor and manufacturing institutes and also work in specialized centers of excellence.

When I was recently touring in Japan—I will just give you another piece of data—I visited Hitachi, and Hitachi alone is spending $1.6 billion in research and development in the general area of electronics and technology areas that support Hitachi, a very large support by an industry.

So when we look at whether this would be a subsidy to an industry which needs very large monetary support to turn this around—much more than $200 million in a concept like Sematech, which incidentally we are still evaluating—we have not come to a conclusion on how we are going to respond to the Defense Science Board report.

But $200 million can only assure us that we have the technologies and manufacturing and process technology that will give us essentially the capability to be at the forefront in the 21st century. It does not guarantee that we will be able to solve the industry's problems.

So we are spending an immense amount of time with people in the Department working with industry to determine how we can leverage that investment, whatever is appropriate for defense, with other Departments in the Federal Government and with industry, to see if we can develop a winning strategy, if you will.

Senator **Bingaman**. Dr. Press, go right ahead.

Dr. **Press**. If I could just take a brief crack at that. If you examine the criteria that single out a particular sector for special attention by the Government, you might have a list that includes national security needs, important to our economic security in the sense that it may be a core technology embedded in many other industrial technologies, and that foreign practices may not be exactly what you would call free market practices in this technology.

I think that technology qualifies for sensitivity on the part of the Federal Government for these various reasons. Now, in the past we have had a variety of government procedures which have helped our computer industry and our aircraft industry, our integrated circuits, avionics, and so many other areas.

They have not been direct subsidies so much as R&D support to industry and the procurement process. I believe that we have a variety of techniques consistent with our traditions that could help this very important industrial sector, and we should use it.

Senator **Bingaman**. Thank you very much.

My time is up. Go ahead, Senator Wirth.

Senator **Wirth**. Thank you very much, Mr. Chairman. I am delighted that you are holding this set of hearings, which are enormously important for not only our defense establishment, but I think the economy overall.

BASIC RESEARCH INSTITUTIONS

And gentlemen, we thank you very much for being here. Let me first of all just start by putting one thing, if I might, behind us and that is the health of our basic research institutions. Do I gather that there is consensus among the four of you that America's basic research institutions are fundamentally healthy, except for the need for the injection of a little more money relative to junior faculty, instrumentation, and buildings—the $100 million that I guess you talked about, Mr. Bloch?

Is that generally the consensus?

THE ACADEMIC SECTOR

Mr. **Bloch**. Well, I think, Senator, that makes a little bit light of the situation. When I said before that we have a healthy technology base, I meant the fact that we are producing new knowledge, that we have good people in all of these areas.

But I would say that we have major problems in these areas. We have major problems in the support that flows into universities, as I cited before. It has been decreasing as a percent of the Federal R&D budget, at a point in time when we have many faculty openings that we cannot fill, where we are seeing a decreasing number of people pursuing science and engineering, which we can barely afford, and where we have instrumentation problems in the universities.

Instrumentation is just not up to the state of the art necessary to allow the proper research to continue. We have facility problems which you have pointed out. I think these are major problems.

Senator **Wirth**. Let me phrase the question a different way. Aside from putting more money into the basic research establishment of the country and particularly in our universities, the institutions are fundamentally sound?

There are not any basic systemic problems that we ought to be concerned about? Let me put it that way, leaving the money aside. And I happen to agree with you, as you know, about the need for us to be doing a great deal more in basic research financially.

But aside from that, we do not have any fundamental problems in basic research that we ought to be looking at, or that might have critical long-term implications for national security?

Dr. PRESS. I do think we occupy a world leadership position in science and technology. And since our science is primarily conducted in the universities, we have to worry about the health of the American university system.

I believe that American universities today are in a state of stress that goes beyond the government support of science. They have a wave of retirements, my generation moving out of the universities and retiring, and vacancies that have to be filled.

And there will be shortages. These highly qualified younger scientists moving into the university positions are not there at the present time in the quantity and caliber we wish to see. There is that concern.

Universities are also buffeted by other factors. The new tax law, for example, makes uncertain the magnitude of private sector giving to the universities. Nobody knows whether that will enhance or decrease the private contributions to universities.

The aging physical plant, the changing demographics of students—you know, the boom generation that came out of the war has moved through the university system. We are going to see decreasing enrollments.

Does that mean decreasing the commitment to faculty sizes? And I remind you that faculty does the research we are so proud of, as well as conducting the classes. And so we have a host of problems, including the dropoff in student loans, which represents another financial problem for our universities.

Universities are faced with a host of problems which might affect their ability to maintain leadership in science.

Senator WIRTH. Again, if I read you correctly, it is essentially a funding issue and it is not institutional, it is not organizational, it is not systemic.

Dr. PRESS. Only in human resources.

Senator WIRTH. Is there agreement on that, Dr. Graham?

Dr. GRAHAM. If I might add, our university system is the envy of the world, and in fact it attracts the world to it. That plus the demographics, the changing demographics that Dr. Press mentioned, has led to a student body, and particularly a graduate student body in the sciences and technologies, which is becoming increasingly foreign in its population rather than domestic, to the point where in engineering, for example, now over 50 percent of the doctorate degrees are awarded to non-U.S. citizens, engineers.

These are fine people, but to support such activities as our national security base and to retain our domestic capability I believe that we need to give serious consideration to the foreign-native mix of students in our universities.

And while that has economic aspects, as do most of the problems in the country and most of the challenges that we face, it is driven by more than just economics.

Finally, I would like to suggest one other area we should give careful attention to, and that is the transfer of technology out of our basic research capabilities, largely focused in universities, into our economic sector. While we are the pride of the world in our basic research, other countries are becoming increasingly skillful at acquiring our basic research and commercializing it, industrializing it, marketing, and selling it back to us.

I view that not so much as the skill of foreign countries, although they are skillful, as the failure of our own industry to stay up with the competition in this area. And we are doing a number of things to try to bring U.S. industry into the university environment and create a joint environment where industry can regain its involvement in basic research and then take it to the commercial and economic sector and put it to the profit of the United States.

Those are a couple of more areas that I think need improvement. The university system is great, but I think it, like all systems in this country, can use constant scrutiny and constant improvement.

SUPPORT ISSUES

Senator **Wirth**. So it really is, as we have been talking about, the need for graduate student and young faculty support and basic research support in universities for graduate students overall as well as for instrumentation and facilities.

Those are funding issues, right? We know how to do those things. We know where those facilities are. We know what that process is.

What you are bringing up, Dr. Graham, are a couple of other issues that are more structural than financial. One of those is the foreign student issue and what implications that has for the investments that we are making in our national security.

And the second that you were just mentioning is our ability to take basic research and apply that to American industry, to American manufacturing, to the American economy. And would you want to call those systemic problems, rather than funding problems? Starting adding those to the funding concern?

Dr. **Graham**. Yes, Senator.

Senator **Wirth**. Those are different kinds of issues from the issues that we in the Congress have historically dealt with in looking at the NSF budget or the issues that you have been so eloquent in over the years, Dr. Press, which relate to basic funding and the plea and the need for that kind of long term investment by the public.

What I am trying to do, Mr. Chairman—and my time on this round has expired—is determine if it is possible for us to think about this perhaps in the way that Dr. Press outlined in his testimony. Starting with a basic look at our long term research institutions; we go from there to key industries, which we tend to focus on and they are very important.

And the semiconductor industry it seems to me, is a marvelous case study of a whole series of issues which I would like to come back to in my second round, if I might.

Thank you, Mr. Chairman.

Senator **Bingaman**. Thank you.

NATIONAL LABORATORIES

Let me just ask, following up on that same line of questioning about the 1983 report that was done on the national laboratories. As I recall, that report pointed up some problems which might be referred to as structural. It pointed to 73 DOD laboratories, and I think Dr. Keyworth's comments about that, when he was in the science adviser's position, were that some of those laboratories move very, very slowly.

Do we have a problem in the structuring of our research activities in the in-house government laboratories? Or is that an area that has a funding problem as well? Dr. Kerber.

Dr. **Kerber**. I would be happy to comment on that. We have a personnel experiment that you are probably aware of at China Lake, which is aimed toward making the personnel system a little more flexible, so that we can reward people and recruit people in an easier fashion.

That experiment has worked quite well. We see an advantage to expanding that to increase the quality of our scientists and engineers in the laboratories.

We have also had some procurement initiatives. Procurement is a problem. For example, when I was at Kirtland Air Force Base we had a very difficult problem in getting research equipment to the laboratories. That is a timing issue. You need it when you need it, and you must have a streamlined system to do that. We are looking at that right now with the lab management task force.

We are also looking at contract streamlining. Many of the laboratories are involved in, of course, external contracting in addition to their in-house work. We have two initiatives in that area, a contract streamlining initiative for the general contract process and a broad agency announcement initiative for fundamental research so that we can basically shorten the time scale to put contracts on the street for the technical areas we want to support.

We are doing those things right now. In addition, we are planning this summer for a Defense Science Board task force to look at laboratory management and management of the tech base in general. We think there are several things that we can do, and the comment of course is made: Well, you have studied this to death.

We do think there are some things we can do that are different than have been previously proposed. Also, the time is right, if you will, with respect to interest. Mr. Godwin, the new Under Secretary of Defense for Acquisition, is very interested in seeing what we can do to make the labs more efficient and more effective. I think we have an excellent opportunity to do that, and we are going to proceed with that study.

I would like to comment that, in addition, when I was at Kirtland there were about six people in my area whom I thought were very outstanding, and right now there is only one of those people left at Kirtland. The reason has to do with the support structure and also the personnel reward structure, i.e., the salaries, et cetera.

The reason that the one person is staying is because he has unique facilities and capabilities, basically research equipment, that he could not get anywhere else. That is another area where we could help support laboratories.

Finally, we are looking at the quality of people we are retaining. It is easy to look at, by quantity, how many scientists and engineers we are recruiting, et cetera. But we need to look at the quality of the people we are losing and the quality of the people we are recruiting. We are conducting a review of that right now.

We are doing many things in the lab management area that are needed in order to improve the situation. We have some very good laboratories. In fact, Naval Research Laboratory is absolutely outstanding. We have some problems in our laboratories and we have some very good laboratories. Unfortunately, those problems bring down the good laboratories. We are trying to work the laboratory problem.

Senator **Bingaman**. Dr. Graham.

Dr. **Graham**. Mr. Chairman, if I might add briefly, the Government labs taken as a whole represent several hundred facilities and a very wide range of institutions and organizations and missions and capabilities. I think one common thread through all of this is that the laboratory leadership in management in the Government system will continue to be a substantial challenge to all involved.

And I am encouraged to see the Defense Department focusing on that this summer. The White House Science Council has in past years looked into that issue as well. We will have to remain eternally vigilant on that issue, though. There is no ignoring it. It will always be there as a problem and one that we have to watch.

I would like to also mention something that I noted in my opening remarks, which is the Technical Transfer Act of 1986, together with the President's State of the Union, in which he addressed the issue of global competitiveness for the United States. Both have mandated more effective transfer of technology from our Government laboratories into our civil sector and our industry.

And we are putting programs into effect now to see that we make the maximum use possible of the technologies developed and contained in these labs by our industrial and our economic sector.

TECHNOLOGY TRANSFER

Senator **Bingaman**. Let me just clarify. I did hear the President talk about his interest in technology transfer, and this was part of his initiative on competitiveness. As I understand it, the President's proposal is to essentially issue an executive order implementing the law that was passed last year.

Am I correct that he is not going to propose any legislation to the Congress or do anything other than try to go forward with what the Federal Technology Transfer Act of 1986 called for?

Dr. **Graham**. Certainly, the first planned step is to issue an executive order to implement the Technical Transfer Act of 1986. However, our interest in the situation will only begin to be substantial at that point.

We will then be in discussions with the agencies, with the lab directors, and the industry itself to monitor how well that is working. And we are more than willing to consider other and additional ideas to make that transfer more effective. We look for those ideas.

Senator **Bingaman**. Let me ask you, Dr. Press, about the statement in your prepared testimony about manufacturing. I thought it was an interesting comment that the ability of defense industry to go forward with new technologies, advance process technologies, is about half as efficient as the nondefense sector.

I believe you say the defense industries have invested in new equipment and advanced process technology at only one-half the rate of the nondefense sector. Then you point out that one of the main efforts to correct that, the ManTech initiative, seems to be getting dismantled.

What are your thoughts as to how we deal with that problem, if in fact we have so much greater inefficiency in the defense sector than we have in the nondefense sector? And I assume the situation is continuing to worsen as technology continues to develop.

Dr. PRESS. Those statements came out of the report of our manufacturing studies board, a report on the defense-related industries. I think some of the reforms suggested by the Packard Commission, if they were implemented, could do a great deal in improving the situation, and included in that would be a greater Defense Department investment in process technology—how to improve productivity, how to improve industrial processes.

That is an important R&D area that should receive more support. And implicit in my statement was that the ManTech program should perhaps be reexamined to see whether it is worth additional investment on the part of the Defense Department.

Senator BINGAMAN. Dr. Kerber.

Dr. KERBER. Yes. If I may, I will make a couple of comments. The ManTech program does not come under my immediate supervision, but I do know that in 1987 our budget in ManTech was $124 million and $165 million is proposed in the 1988 budget.

There are also some specific projects in there, such as produceability of focal plane arrays, that are specific to our current technology thrust. In addition, in the program for which I am responsible, the science and technology program, there are very strong manufacturing facets in the VHSIC program which I mentioned in my opening statement—the very high speed integrated circuit program. In the millimeter wave microwave integrated circuit program, called MIMIC, and the materials program itself we are looking at manufacturing processing technology, for example processing of various composite materials, organic and ceramic composite materials.

So within the science and technology base we have a significant number of programs that are involved in produceability and affordability of various materials. The ManTech program, as far as I am aware, is receiving a significant increase in the 1988 budget.

Senator BINGAMAN. My 10 minutes are up. Senator Wirth.

Senator WIRTH. The assumption that we all share, I guess, is that the basic research at our major research institutions is underfunded. That is what we discussed in the previous round. We have to put more funding into those. There are some structural problems, but they are minor compared to the funding problems. Is that correct?

Is that a fair summary of the earlier 10 minutes of questions and answers?

Dr. PRESS. Could I put it this way? It is the best funded in the world, but marginal increases, increases in investment in basic research, would return such enormous dividends at relatively low cost that it really deserves your special consideration in this respect.

Senator **Wirth**. Then if that is the case and we all agree upon that——

Dr. **Graham**. Excuse me, Senator. May I just comment that there is no question that in research in most cases more funding is better. As you know with such painful clarity, we are in an austere budget environment and we are trying to push in all directions on the budget.

And while basic research is in fact receiving, as far as I know, the most substantial percentage increase in the entire Government and the administration is making a great deal of emphasis on continuing to increase the funding for basic research and has committed to doubling the funding for the National Science Foundation in the next 5 years, in addition to a 17 percent increase in this year, there is no question that further funds in basic research could be well applied.

What we are really talking about here is a balance between the very difficult problem of reducing the overall deficit and the national debt on the one hand and moving as rapidly as possible technologically with our basic research on the other.

Senator **Wirth**. I appreciate that impassioned White House defense of your budget, Dr. Graham. But I do not think the numbers substantiate that, it is my understanding—and Dr. Kerber, you can fill me in if this is correct—that in fact the 6.1 allocation in the fiscal year 1988 as demonstrated right here in one of the tables made available to us has a 1 percent decline in it. Is that right?

Dr. **Kerber**. That is correct.

Senator **Wirth**. Well, it seems to me we just heard from Dr. Graham that there is a significant increase going on here, and you are telling us that in fact there is a decrease. Who is right?

OK, Dr. Kerber, you are. Will you tell us why you are correct, Dr. Kerber?

Dr. **Graham**. May I just say, I was speaking about the national R&D budget as a whole and not just the Defense Department.

Senator **Wirth**. I realize that. I understand that. But we all agree that there is a problem here and we know we can spend a lot of time playing button, button, who's got the button, or trying to turn things over.

I have a basic concern about this establishment and have for a long time, and I think what has happened in this administration, Dr. Graham, is that you guys have starved it and you have caused us some very severe long term problems, and we have some real problems in catching up with that.

That is where I am coming from, and I think there are a lot of people up here who share that perspective. And what we have got to do is get on with the business of developing a cooperative approach as to how we are going to make long term investments and not play games with the numbers.

Dr. Kerber.

Dr. **Kerber**. Yes, I wanted to comment that the Department's budget submission is a minus 1 percent in real growth from 1987 to 1988, and it is a plus 4 percent from 1988 to 1989.

Senator **Wirth**. We only have this year's budget to deal with, as I understand, though. Is that right, the appropriations are for this year only? And I have been here for 12 years and I have watched this go on, too, Dr. Kerber.

Dr. **Kerber**. The other thing I want to comment on is that our total budget submission requests a 5-percent increase for science and technology. The reason you see that distribution on the chart is the Packard Commission and others have commented even in this testimony today that we have a problem transitioning technology from the laboratory into military systems.

If you look at our national strategy, you will see that we need to get technology into military systems. We are tending to lead the Soviets in essentially every area in the development of new technology, but we have tended to fall behind in deployed technology.

In artillery systems and mines and other systems, there are about three or four areas where the Soviets can deploy their technology more rapidly than we can. We are trying to aggressively move into technology transition and insertion.

OVERALL BASIC RESEARCH EXPENDITURE

Senator **Wirth**. Let me ask you a related question, if I might. How much is the overall basic research expenditure from the Department of Defense?

Dr. **Kerber**. In basic research, we would say that is what we call our 6.1 budget. For fiscal year 1988, that is $918 million.

Senator **Wirth**. The total amount of basic research funded by DOD is how much?

Dr. **Kerber**. Our request for this year is $918 million.

SDI SPENDING

Senator **Wirth**. And how much are we spending this year—not proposed for next year—but how much are we spending on SDI?

Dr. **Kerber**. In 1988 or currently?

Senator **Wirth**. Currently.

Dr. **Kerber**. About $3.7 billion.

Senator **Wirth**. And how much has the administration come up and requested for SDI for next year?

Dr. **Kerber**. I think it is about $5.2 billion.

Senator **Wirth**. So an increase of $1.5 billion.

Dr. **Kerber**. That is correct. The SDI, of course, does have a mixture of what we would call basic technology, which we have been discussing, 6.1, exploratory development and advanced technology development.

Senator **Wirth**. It seems to me, that after the discussion we have just had about the importance of research and the technology base and comparison of the SDI numbers with all of our research needs, we should ask whether or not the expenditure of an additional $1.5 billion in research on SDI really leads us to a healthy balance of research priorities.

Do any of you have any comment on that?

Dr. **Kerber**. I have looked at the support of the S&T budget over the lifetime of the SDI——

Senator **Wirth**. Excuse me?

Dr. **Kerber**. I have looked at the support of the science and technology budget, which are the numbers that we discussed, the 6.1, 6.2, 6.3A numbers, over the lifetime of the SDI, and we have had positive real growth over the total lifetime of the SDI in basic non-SDI technologies.

Senator **Wirth**. But to go to the question of whether or not we are funding and setting priorities properly in terms of the structure and the funding of our basic research establishment, is it your judgment that, in terms of those priorities, we are doing as well by the basic R&D structure as we can and that this is a healthy balance, is that right?

Dr. **Kerber**. That is right.

Senator **Wirth**. Do any of the others have comments on that?

Dr. **Graham**. Senator Wirth, I think that two concepts are becoming mixed here and I would like to try to separate them. On the one hand, as I mentioned in my statement and as you mentioned subsequently, we all have a concern that the basic research being carried out by the Department of Defense is an adequate fraction of their overall effort.

On the other hand, I would like to point out that the basic research across the entire Government that is being conducted, including in the National Science Foundation and the other Departments and the DOD, has been systematically increasing throughout this decade and will continue to increase this year and thereafter.

So I think the case that says that we are underfunding research as such is not applicable, because we are in fact increasingly funding basic research in a very strong, consistently growing manner. And that is very much the intention and the policy of the President, to continue to do so.

We put a great deal of emphasis on basic research.

Senator **Wirth**. And the same thing is true—when we talk about basic research, I think we are talking about the institutions that we have here. That is true for the kind of support that we seek for facilities and graduate students and young faculty, is that right?

Dr. **Graham**. It varies across the specific accounts. For example, a recent study by the National Science Foundation that Mr. Bloch may wish to address indicates that the requirements in the facilities area are not as great as the requirements in the instrumentation area.

And so you get a different balance of support in various areas. I was adding up the entire basic research Government account for the Federal Government year by year this decade, and you will see a consistently growing pattern of that. And I would be glad to submit the figures for the record.

Senator **Wirth**. Mr. Bloch, would you like to respond?

RESEARCH BALANCE

Mr. **Bloch**. If I could comment on this set of questions you have been pursuing. If it had not been for what the administration has done over the last few years in terms of basic research, we would be in deeper trouble today.

We have a way to go, and the doubling of the National Science Foundation budget, which I hope Congress will agree to, again is a major step forward in realizing that the balance between basic research on the one hand and all other research is not what it should be. It has deteriorated. Even with that doubling of the National Science Foundation's budget, we are not going to get where we want to be.

And the second thing, which the White House Science Council report has pointed out and recommended is that university basic research should be doubled. And while that is going on in the National Science Foundation, it is not going on in some of the other departments.

So I think we have a long way to go. But I agree with Dr. Graham, one wants to be very careful not just to put everything under one particular number, but to look very clearly at many of the areas, people as opposed to facilities, as opposed to instrumentation, university as opposed to total basic research, and so forth.

Senator BINGAMAN. Let me just follow up. There is a statement in the report done by the Academy panel on physics research last year. I would like to ask Dr. Press if he would have any comment on it.

It is stated, quote: Corrected for inflation, the 1983 combined Army, Navy and Air Force funding level for physics research was 30 percent below the 1969 level. Moreover, the weakening of support for physics research related to national security has been compounded by two other factors, a shift by defense research agencies away from long range research and toward shorter range research or development; and the concomitant widespread abandonment of long range research programs by U.S. industrial firms, both defense oriented and commercial.

Are the trends that are identified there accurate in areas other than physics, Dr. Press, or is that an isolated circumstance that they're talking about?

Dr. PRESS. I think that refers to basic research and not research and development. As supported in the Defense Department, taking inflation into account, I think it will show that over the years that has gone down, as described, though.

Senator BINGAMAN. So there has been a decrease in defense related basic research or defense supported basic research?

Dr. PRESS. Yes. And that is not entirely due to the people who run the Defense Department in various administrations. In many cases, including the present administration, there have been efforts to increase that basic research funding, but Congress has not gone along with it.

What happened to the university research initiative this past year is a good example.

So one has to disaggregate all of these things to see what's happening agency by agency.

Senator BINGAMAN. My understanding is that the DOD Comptrollers Office recommended the cuts that were made by the Congress in that university account this last year.

Dr. PRESS. I didn't know that.

Senator BINGAMAN. Dr. Kerber, did you have information on that?

Dr. KERBER. I wasn't aware of that, but let me comment.

Senator BINGAMAN. We need to have you sit in on these conferences.

Dr. **Kerber**. There are a few facts that you should know. One is that the 6.1 budget, the basic research, is only part of the Department's support of universities. It's about half. They receive about $500 million in the basic research category and about $500 million from the other research categories.

So universities receive about $1 billion total from us. Also, if you look at the fraction of funds that they received from the basic research category in 1970, it was about 40 percent. Now that fraction is approaching 55 percent from the basic research category that goes to universities.

So they've become a much more significant player in that arena.

In addition, if we look at total Federal obligations for universities, I think in 1970 about 15 percent was supplied by DOD in the basic research area. That dropped to about 8 percent in the middle 1970s and is back up to about 12 percent in 1986.

So the Department has reduced at one time and now has increased its support of universities. Except for the year that you pointed out where we took the negative hit, if you look at the funding trend of basic research over the past 20 years, you'll see that it dropped in the middle 1970s, and then increased, except for the last 2 years, quite strongly.

We're about 80 percent of where we were in the early 1960s in constant dollars.

Senator **Bingaman**. Dr. Graham.

Dr. **Graham**. Mr. Chairman, if I might add, the national totals in the basic research area, in 1970, the basic research funds, according to OMB's special analysis, were $1.9 billion.

In 1980 it was $4.7 billion. And the estimate for 1988 is $9.1 billion, or almost double the 1980 figure.

And the profile shows a constant, year by year, increase in basic research over the—from 1980 to the present period of time.

So I believe that adds substance to my comment that there has been substantial growth in the overall governmental funding and basic research this decade.

Senator **Bingaman**. Dr. Press, you said that we have moved into a period where the transfer of technology from the commercial sector to the defense sector accomplishes more than the transfer from defense to the commercial sector, which maybe was the case in the decades immediately after the second World War.

If that's true, does that imply some changes in policy need to be made that we have not yet focused on with regard to the Federal Government's support.

What does that imply in your mind as far as what action we ought to be taking?

Dr. **Press**. We have to be sure that our dual use industries, which contribute both to defense as well as to the civil sector, are economically healthy, sufficiently healthy to have good R&D budgets, and that means, good markets, to have the cash turnaround to support research in an environment where new products are outmoded in a very few years.

And these are our most competitive industries. We have to make sure that our national policies, our national economic policies, foster them; that our trade policies help them; and we have to keep the pressure on these industries to make sure that they have the best management, which is innovative, imaginative, willing to make long term investments as well.

They are essential to our economic future, and therefore, to our military technological strength.

Senator **Bingaman**. Dr. Graham, do we have the ability to coordinate the various research that is going on? Is your office positioned, or is any place in the Federal Government, positioned to oversee all of the research funding that is being done through the Federal budget and make corrections, or see to it that those areas requiring funds are getting the necessary resources?

Is that part of your job, as you see it?

Dr. **Graham**. Yes, Mr. Chairman, that is part of our statutory responsibility as the Office of Science and Technology Policy. That is, as I'm sure you're aware, a very large job. However, and I would like to say, that we do it in close cooperation first with the Office of Management and Budget, and second, with the other agencies of the Government who actually conduct the research and development activities.

And finally I would like to comment that the agencies themselves, the Defense Department, the National Science Foundation, NOAA, NASA, and so on, I believe make substantial efforts themselves to coordinate their activities. And the Office of Science and Technology Policy and the Federal Coordinating Council for Science, Engineering and Technology works to increase the coordination among these activities.

I would not claim perfection in that activity, but I would claim substantial dedication and interest in doing that.

I think one of the strengths in fact of the way we have organized science and technology in the American Government is that it is carried out in a broad number of agencies rather than focused in one particular agency, as tends to be done in some countries.

And the price we pay for that diversity is the requirement for interagency coordination. We realize that responsibility and work to meet it.

20 MOST IMPORTANT BASIC TECHNOLOGY AREAS

Senator **Bingaman**. The Department of Defense has their list of the 20 most important basic technology areas that they submitted to us. It is similar to the list of 17 you had on your chart for the previous year.

Is there anything done government-wide of a similar nature, where there is an attempt to develop a consensus among the various organizations with authority in this area, or with responsibility in this area, to have a consensus to those areas of science or technology requiring the highest priority?

Dr. **Graham**. The missions of the different agencies of the Government, Mr. Chairman, tend to be so diverse, that we don't try to impose one list of priorities on them, other than through the Federal budget process, which by virtue of allocating the resources, necessarily puts some prioritization in the activity.

We do turn to the individual agencies to recommend their own individual priorities, and we review those as a part of the budget process, and at other times as well.

Senator **Bingaman**. Mr. Bloch.

Mr. **Bloch**. If I could follow up on Dr. Graham's comment. While a list of 20 most important technologies or science areas can be put together relatively easily and it is not easy, but relatively easy—by a department like the Department of Defense, I think that would be very difficult to do for the Government as a whole.

For instance, what are the 20 most important technologies, science areas, engineering areas, for the National Science Foundation? That is an entirely different story.

But what is happening under Dr. Frank Press' guidance is that every year we single out three or four major areas and take a good look to see what they mean in terms of their future for the country, as well as what they mean in terms of the various departments that have to participate in their development.

I think that is probably a much better approach than trying to come up with a consensus of 20 technologies across the whole Government.

If I were Dr. Graham, I would despair of getting a list like that together.

Senator **Bingaman**. Senator Wirth.

Senator **Wirth**. Thank you, Mr. Chairman. Let me return if I can to the semiconductor issue, about which there has been a great deal of division over the last couple of months.

I gather, Dr. Graham, from your statement on page 4, that the OSTP, with the support of the White House Science Counsel will make a decision late this spring or early summer as to what you're going to do on the semiconductor initiative. Is that right?

Dr. **Graham**. We will certainly be looking at a series of options, and trying to provide a leadership role from the national perspective on what is to be done.

Senator **Wirth**. Is that the White House's position on whether or not they're going to agree to do this? Will that come out of your office?

Dr. **Graham**. The White House's position will presumably come from the President, Senator Wirth. But one of my statutory responsibilities is to advise the President on matters of science and technology.

Senator **Wirth**. Do you know when the administration is going to make a decision, when the White House will make a decision about their position on Sematech, or on what the Defense Science Board is suggesting?

Dr. **Graham**. No, Mr. Chairman, I don't. Again, that will be the President's decision, if in fact a Presidential decision is required on that subject.

And that is one of the issues before us at this point. But we are putting that on a very fast track to see what the various options are, options for the Government to pursue, options for industry to pursue, options for Government and industry to pursue jointly.

Senator **Wirth**. As I remember earlier in the response to Senator Bingaman's question, you said you were not going to do a lot of original research on this but would review existing literature with a late spring analysis and recommendation out of your office?

Dr. **Graham**. Yes, a late spring set of recommendations from the White House Science Council. And presumably, if I am not put off by all of them, that will manifest itself in recommendations and guidance to various parts of the Government.

Senator **Wirth**. Does that mean we presumably would not get an administration decision on the administration's position until summer?

Dr. **Graham**. I wouldn't presume to predict when specific actions will take place, based on so much uncertainty in the planning process. But I realize that this is a critical issue, and it needs a fast response.

Senator **Wirth**. Let me, in the time that's available to me, ask Dr. Kerber what DOD's position is going to be. I note in the budget and in your testimony you point out that DOD would like to commit some $50 million, in fiscal year 1988, and $50 million in 1989. Yet the Defense Science Board task force—headed by Norm Augustine—said that the most important action needed to be taken by the U.S. Government is for the Department of Defense to encourage and actively support with contract funding the establishment of the U.S. Semiconductor Manufacturing Institute, formed as a consortium of U.S. manufacturers.

Now, there's a big difference between the DSB and Norm Augustine and what you all have in the budget, correct?

Dr. **Kerber**. That is correct. It is tough to pick up $50 million, I can assure you.

Senator **Wirth**. I can understand that. But you haven't made a decision yet as to what DOD is going to do?

Dr. **Kerber**. That's right.

Senator **Wirth**. What kind of timetable are you under to make that sort of decision?

Dr. Kerber: We're working, of course, within the administration. We're working with the other Departments, the National Science Foundation, the Department of Commerce, OSTP, and the DOE to see what we can do as a collective group.

The $50 million will give us the capability to develop some research and technology to develop processing and manufacturing equipment that would make a difference in the next century. That is about all we can do with those funds at this time.

We really hope that we can leverage those funds both with other Departments, through a national assessment that Dr. Graham has talked about, as well as with industry.

I think industry has as much interest in this problem as we do, and they're working very well with all elements of government to see what we can develop as a strategy.

Senator **Wirth**. I would assume that maybe at this point we are beyond the ideological battle as to whether or not the Federal Government should become involved in helping this industry; is that right?

Dr. **Kerber**. From my perspective, we are interested in making sure that we have the technologies available for our defense strategy. It is not really an issue of helping industry but making sure that the technologies are there for the defense systems we need.

Senator **Wirth**. The word, subsidy, was brought up by you, Dr. Graham. I don't think anybody else was using that word. But do you think we're beyond the point of, again, the ideological battle on this? The question now is: how we go about forging a partnership in this particular area?

Dr. **GRAHAM**. I hope we're beyond the ideological battle, Senator Wirth. And in fact, as I described, we want to act in an expeditious manner, and in the proper role for Government, and in the proper role for industry.

But we want to make sure that we are productive in our actions when we take them. I believe that the discussions we've held within the Government and within the industry, even to this point, have been very productive.

I met with representatives of the semiconductor industry late last week, and I believe they are moving in a very constructive manner. And I look forward to working with them, both through OSTP and I presume through other parts of the Government, to do all that is appropriate for Government, while industry itself is making a major effort to retain its competitiveness.

Senator **WIRTH**. Just in closing, as you and I have discussed, Mr. Chairman, I think this is an enormously important issue, not only by itself, but as part of a broader issue as we approach the late 1980s and the end of this century. It involves looking at what the public-private partnership is going to be in strengthening this industry, what are we going to do with this industry, what model is going to be established for what we do with other industries, who, as I think all of you have suggested, are also the ones that we ought to be looking at. What we do on semiconductor is going to be extremely important in regards to our broader defense industrial base.

And so we look forward to working with all of you in trying to sort this through in the best possible fashion, and in a way that sets the right precedents for the future.

I happen to believe that we do want to move and move expeditiously, and I think there are a lot of people that feel that way. And we look forward to getting your report, Dr. Graham, at the earliest possible date.

Thank you, Mr. Chairman.

Senator **BINGAMAN**. Thank you.

Let me just conclude by indicating, Dr. Press, in your testimony you have an interesting few sentences where you say, the codevelopment projects offset agreements, and licensing arrangements in the military sphere are likely to have some adverse side effects from a competitive standpoint.

Deliberate use of defense involvement to protect or promote domestic industries, though not dissimilar to the practices of other governments, would complicate the politics of the alliance. And while it is important to acknowledge these tensions, they can be resolved on a case by case basis.

We're going to have a hearing next week on this exact set of issues, related to the industrial base, and what the proper role of the Defense Department and the defense budget is.

Did any of you have comments on that issue, before we conclude? This may be your last chance here for a week or two?

Dr. **PRESS**. I didn't try to make recommendations but to lay out the costs and the benefits of each of these approaches.

We have to do coproduction with our allies in some cases for military reasons, to maintain the alliance. On the other hand, that does involve a transfer of technology, and that has certain costs. And the only way I can see to analyze it is as you're doing it with Sematech: take it case by case, and see what the issues are, and see what has to be done of a special nature or within our traditional procedures and then make your decision.

Senator BINGAMAN. Does anybody else have a comment on that? Dr. Graham.

Dr. GRAHAM. Mr. Chairman, I certainly strongly subscribe to Senator Wirth's perspective on this problem that he made in his concluding remarks.

And we are interested in the viability and the competitiveness of the semiconductor industry. We are also very interested in the global competitiveness of our U.S. industrial base overall, and we want to take steps that will enhance that from this point forward.

And that is very much our intention as we proceed this year.

Senator BINGAMAN. Well, thank you all very much. We appreciate your testimony. I thought it was excellent.

[Questions for the hearing record with answers supplied, follow:]

QUESTIONS SUBMITTED BY SENATOR JEFF BINGAMAN

RESEARCH AND DEVELOPMENT SPENDING

Senator BINGAMAN. Mr. Bloch, in your statement, and in some other data you have provided us, you compare the percentage we spend in various R&D categories with the percentages our competitors spend. These percentages are all expressed in terms of GNP. These data generally show that the percentage of R&D expenditures by some of our economic competitors is higher than that of the U.S. However, in absolute terms, the U.S. is still spending more. This is because our GNP is so much greater. Dr. Press pointed out in his statement that in 1983 American industry overspent Japan and the EEC countries combined. Yet if we look at a number of indicators such as foreign trade, patent applications, and so on, we are rapidly losing our competitive advantage. Does this suggest that the problem may not be "how much we are spending," but "where are we spending it?"

Mr. BLOCH. There is no question that there are other determinants of international economic competitiveness besides R&D spending. Exchange rates, interest rates, antitrust policies, export controls, and other factors all may be important. But in the long run, education and research spending will determine the ability of the Nation to create new knowledge and apply it to make new products and processes, and to manufacture them efficiently. In the long run, I believe that nothing is more important for economic competitiveness than sufficient investment in education and research.

Senator BINGAMAN. Mr. Bloch, many have expressed concern that the administration is giving low priority to civilian R&D and is failing to coordinate military R&D with civilian needs. Do you agree with that? Do you have any recommendations?

Mr. BLOCH. I do not agree that the administration is giving low priority to civilian needs. In the civilian sector there has been a strong shift of resources toward basic research, which is exactly what should have happened. And with this year's NSF budget, we see an initiative toward restoring the fraction of total Federal R&D that goes to universities, which was one of the major concerns of the Packard-Bromley report.

We clearly should do whatever we can to coordinate the defense and civilian R&D sectors, for the good of both. Defense technologies are more dependent on civilian R&D than was once the case.

Senator BINGAMAN. I would like to direct this question to both Mr. Bloch and Dr. Kerber. The recent report by the White House Science Council, the Packard-Bromley report, called for a major Federal initiative in the area of increased support for basic research. How do programs in the National Science Foundation and the Department of Defense dovetail with the recommendations of the Packard-Bromley report, especially for fisical year 1988?

Mr. **Bloch**. Two of the most important of the Packard-Bromley recommendations were additional funding for universities, and more science and technology centers. The commitment to double the NSF budget over the next 5 years reflects these recommendations fully. They will remain a priority in the future.

Senator **Bingaman**. Mr. Bloch, your statement pointing out that the administration has made a commitment to double the National Science Foundation budget over the next 5 years. How does the NSF propose to spend this? How will defense concerns be factored into your plans?

Mr. **Bloch**. The priorities of the Foundation are: First, the development of human resources; second, the growth of science and technology centers; and third, the growth of support of disciplinary research projects and specialized facilities These are likely to remain the priorities for the foreseeable future, although it should be noted that supporting disciplinary research will remain our largest activity in absolute terms.

Defense concerns will be taken into account through normal interagency coordination procedures. In general, we believe that military strength depends heavily on education of scientists and engineers and basic research in science and engineering.

Senator **Bingaman**. Mr. Bloch, we have been talking about the health of the technology base as it relates to the needs of defense for the country. Obviously the Strategic Defense Initiative is very much dependent upon a strong and vibrant technology base. Is the SDI focusing enough attention in the scientific and technology areas basic to the success of SDI?

Mr. **Bloch**. You are correct in noting that there is a heavy dependence on technologies for which basic research is required. SDI funding of basic research must therefore be a high priority for that program.

Senator **Bingaman**. Mr. Bloch, some of the data we have received from you makes an issue of the fact that fewer Americans are electing technical fields, and in fact more than half of our new engineering Ph.D.'s have been foreign nationals. Dr. Press, on the other hand, has said in his statement that we do not have a shortage of engineering personnel in civilian labor markets. Would you two gentlemen like to address this seeming dichotomy?

Mr. **Bloch**. There is no necessary inconsistency between these two comments. In the short run, engineering positions in industry are filled one way or another. Companies do not create large number of positions that they do not expect to be able to fill, even when they could use more engineers. And there is a good bit of mobility between fields, which is one of the strengths of our system.

On the other hand, in the long run the increasing dependence of our society on science and technology inevitably means that more technically trained people will be required. At the same time, demographic trends are clear: the numbers of young, nonminority men, the group from which scientists and engineers have traditionally been recruited, is declining both absolutely and relatively. We will have to recruit women and minority men for these professions in increasing numbers. That will take effort, and it will take time. We need to be working hard on it.

Senator **Bingaman**. Mr. Bloch, we have heard and read from a number of sources that our technology base is in trouble. To support this, data showing patents, high-tech export balance, the number of engineering students, and so on, are presented. Are these really the best measurement system for determining the health and vitality of the tech base?

Mr. **Bloch**. There is no single measure of the health of the technology base. We can look at performance indicators such as patents, publications, and trade balances. These will give us an overall picture, but we have to realize that they depend on many factors; they do not measure just the technology base.

Second, we can look at more direct indicators of the state of the base itself, such as numbers of personnel, funding levels, and the condition of equipment and facilities. These need to be interpreted mainly in terms of trends rather than absolute levels. For example, we know that the rate of investment needs to rise as the economy grows; if it does not keep pace, we have an indicator of trouble. It is not an exact science, but when we have a lot of indicators all pointing in the same direction, and when a number of different observers, committees, and review groups all reach similar conclusions, then action is justified.

DEFENSE R&D SPENDING

Senator **Bingaman**. In his book The Defense Industry, Dr. Jacques (pronounced "Jack") Gansler pointed out that the share of research and development funding allocated to R&D in the full-scale development of major systems had been increasing with a corresponding decrease in the share of funds going to basic and advanced research. Has this trend changed since 1981?

Is this a serious long-term problem for the technology base?

Mr. BLOCH. To my knowledge the trend has not changed. In the short run this is unavoidable, given heavy commitment to the development of major systems. In the long run, however, it is important to maintain balance between basic research and education, which contribute directly to the technology base, and development programs that draw from it.

Senator BINGAMAN. Recently, both the Department of Defense and the Congress have supported policies designed to force the defense industry to bear a greater share of the risk on major defense programs. These measures include a reduction in progress payment rates, changes in the profit guidelines, an increase in contractor-funded special tooling and an increased use of firm fixed price contracts. Many concerns have been raised that defense contractors will be in much weaker position to support internal basic and advanced research efforts. Gentlemen, do you feel these new policies will have a detrimental impact on our technology base?

Mr. BLOCH. I am not in the position to comment on the specifics of defense contracting policy.

TECHNOLOGY BASE

Senator BINGAMAN. Dr. Press, you point out that the United States has a commanding share of world output of published papers and citations to recent papers, yet the data I have seen with respect to patents shows the United States is rapidly losing the commanding lead it once had in this area. What causes this disconnect?

Dr. PRESS. The trend in the share of patents held by U.S. nationals is often interpreted as a sign of declining U.S. "inventiveness," but one must be very cautious in drawing conclusions about relative national technological capabilities from patent data. The growth of cross-national patent filings is, above all, a sign of the integration of Western economies and, in particular, the openness and attractiveness to foreign enterprises of the U.S. market. The increase in foreign filings has gone hand in hand with the growth of imports and foreign direct investment in the United States. Moreover, the importance of patents varies among industries and over time. In areas where production processes are changing rapidly and product life cycles are very short, there is a much greater reliance on trade secrecy than on patent protection.

Although it is obvious that technological capabilities abroad have advanced and in a few cases surpassed those of the United States, I do not believe that the rate of invention in the United States has declined absolutely.

Senator BINGAMAN. Dr. Press, your statement commented on the good connections that exist between universities and Government laboratories. I would like to hear more of your assessment is this area. Are the connections really that good? What are the trends in this area? What are the "new relationships" you talk about that exist between universities and industry?

Dr. PRESS. The relationships between universities and industry in the United States, although not fully developed or free of problems, are a good deal closer than they are in most other industrialized countries, including Japan. The phenomena of industrial investment in long-term university research, patenting and licensing by universities, and even spin-offs of commercial ventures that have occurred in biotechnology, for example, have few if any parallels in other countries. Indeed, foreign corporations have been more active in developing relationships with American research universities than with those in their own countries.

Biotechnology is, of course, unusual in that basic research often yields near-term applications. But it is encouraging that as more university-industry relationships become established, the more Federal research support programs are incorporating industrial participation as an element. Examples are the 4-year-old Engineering Research Center program and the proposed Science and Technology Center program of the National Science Foundation. At the Foundation's request, and Academy panel is currently developing guidelines for such participation and other features of the S&T Centers. Its report will emphasize that the extent of interaction varies greatly among scientific fields. Nevertheless, quite apart from financial leveraging, corporate participation can bring valuable perspectives to both research and education as well as facilitate the transfer of new knowledge to practical applications of economic significance.

Senator BINGAMAN. Some of the data we have received from you makes an issue of the fact that fewer Americans are electing technical fields, and in fact more than half of our new engineering PhD's have been foreign nationals. Dr. Press, on the other hand, has said in his statement that we do not have a shortage of engineering personnel in civilian labor markets. Would you two gentlemen like to address this seeming dichotomy?

Dr. **Press**. The two statements are not in conflict. For one thing, industry hires far more engineers with undergraduate and master's degrees than Ph.D. engineers. Second, a large number of technically trained foreign nationals remain in the United States. I agree wholeheartedly, however, that we need to attract more U.S. nationals into technical fields and especially into postgraduate education in those fields.

Senator **Bingaman**. Dr. Press, we have heard and read from a number of sources that our technology base is in trouble. To support this, data showing patents, high-tech export balance, the number of engineering students, and so on, are presented. Are these really the best measurement systems for determining the health and vitality of the tech base?

Dr. **Press**. There is no single quantitative measure or even set of measures of the quality and performance of the technology base. Patent, trade, and manpower data are all useful but partial indicators. The same is true of financial measures such as capital investment and return on investment. There really is no substitute for qualitative assessments of relative national capabilities and accomplishments in particular technologies, although even these have limited predictive value.

Senator **Bingaman**. Recently both the Department of Defense and the Congress have supported policies designed to force the defense industry to bear a greater share of the risk on major defense programs. These measures include a reduction in progress payment rates, changes in the profit guidelines, an increase in contractor-funded special tooling and an increased use of firm fixed-price contracts. Many concerns have been raised that defense contractors will be in much weaker position to support internal basic and advanced research efforts. Gentlemen, do you feel these new policies will have a detrimental impact on our technology base?

Dr. **Press**. As the Packard Commission recognized, there is always going to be tension between cost constraints and technology development in military systems procurement. Although recent cost-cutting measures may discourage some contractor investment in the technology base, the incentives have not been large in the past. In addition to monitoring closely the effects of changes in procurement policies, it is important to maintain an adequate Independent Research and Development (IR&D) program to support advanced research work by defense contractors.

Senator **Bingaman**. In 1981, in his book The Defense Industry Dr. Jacques (pronounced "Jack") Gansler pointed put that the share of research and development funding allocated to R&D in the full-scale development of major systems had been increasing with a corresponding decrease in the share of funds going to basic and advanced research. Has this trend changed since 1981?

Is this a serious long-term problem for the technology base?

Dr. **Press**. As I pointed out in my testimony to the subcommittee, the recent pattern of Defense Department 6.1 funding is cause for concern. After substantial growth in the early years of this decade, accompanied by a strong commitment by DOD to strengthen its ties with academic basic research, we have recently seen reductions in 6.1 levels. Indeed, the fiscal year 1987 appropriation for 6.1 programs was 5 percent below the fiscal year 1986 level and 7 percent under the budget request. For an excellent discussion of the trends and their implications, I refer the subcommittee to the February 26, 1987, report of the DOD-University Forum Working Group on Engineering and Science Education, chaired by Dr. Cornelius Pings of the University of Southern California.

SHARE OF R&D FUNDS IN DEVELOPMENT OF MAJOR SYSTEMS

Senator **Bingaman**. In 1981, in his book The Defense Industry, Dr. Jacques (pronounced "Jack") Gansler pointed out that the share of research and development funding allocated to R&D in the full-scale development of major systems had been increasing with a corresponding decrease in the share of funds going to basic and advanced research. Has this trend changed since 1981? Is this a serious long-term problem for the technology base?

Dr. **Kerber**. DOD funding data indicate that, in absolute terms, there has been significant real growth in research and exploratory development since 1981. However, Dr. Gansler is correct in pointing out that since 1981 research and exploratory development funding as percent of total DOD Research, Development, Test and Evaluation has decreased.

In developing the DOD budget submission the overall balance among the various components of the RDT&E activities has been very carefully considered, and we believe we have developed an optimum program to meet defense needs. We continually reevaluate this issue, and, should there be compelling rationale for initiating still greater real growth in research and exploratory development, we will seek budget approval for such appropriate action.

EFFECT OF NEW CONTRACTING POLICIES ON RESEARCH

Senator BINGAMAN. Recently both the Department of Defense and the Congress have supported policies designed to force the defense industry to bear a greater share of the risk on major defense programs. These measures include a reduction in progress payment rates, changes in the profit guidelines, an increase in contractor-funded special tooling and an increased use of firm fixed-price contracts. Many concerns have been raised that defense contractors will be in much weaker position to support internal basic and advanced research efforts. Gentlemen, do you feel these new policies will have a detrimental impact on our technology base?

Dr. KERBER. It is very difficult to judge the impact of such actions on the technology base. The funding DOD allocates for the technology base (6.1 plus 6.2) is based primarily on programmatic parameters not on the factors you cite. Government-allowed IR&D overhead charges are likewise independent of these factors. Finally, industry also performs R&D which is not reimbursed either through direct contract or through IR&D overhead charges. If there is to be any impact from the factors you cite, it will most likely appear in this last category of R&D activity. However, you may be assured that we are sensitive to your concerns in this regard and will work constructively to maintain a healthy technology base.

PACKARD-BROMLEY RECOMMENDATIONS

Senator BINGAMAN. Dr. Kerber, I would like to direct this question to both you and Mr. Bloch. The recent report by the White House Science Council, the Packard-Bromley report, called for a major Federal initiative in the area of increased support for basic research. How do programs in the National Science Foundation and the Department of Defense dovetail with the recommendations of the Packard-Bromley report, especially for fiscal year 1988.

Dr. KERBER. Recommendations made in the Packard-Bromley report included support for a major initiative to establish university-based interdisciplinary, problem-oriented research centers; establishing merit-based fellowships in science and engineering disciplines; making greater use of block grants or contracts to support groups of investigators; reducing the paperwork burden associated with contract and grant administration; and eliminating the formal requirement for cost-sharing. DOD is involved in activities specifically supporting these recommendations.

The University Research Initiative (URI), begun in fiscal year 1986, was designed to establish multidisciplinary research programs and centers focused on accelerating progress in 10 key defense technologies. Following a major national competition in which 175 institutions submitted 965 proposals, DOD selected 86 projects at 70 institutions for URI funding. URI also includes support for merit-based portable fellowships in scientific and technical disciplines important to the defense mission and opportunities for graduate students to participate in the multidisciplinary research ongoing under URI programs. A block grant/contract approach was used in awarding projects. DOD has submitted fiscal years, 1988 and 1989 budget requests to maintain the URI program at existing levels.

DOD, with the Office of Naval Research taking the lead, is also actively involved in the Florida Demonstration Project. This is a cooperative effort among five Federal agencies, the public and private universities in the State of Florida, and the National Academy of Sciences Government-University-Industry-Research Roundtable. The project has as its purpose to demonstrate a standardized approach to Federal support of university research. The Demonstration Project's goals are: to eliminate Federal approvals of the principal investigator's/grantee's resource allocation decisons; to eliminate tens of thousands of documented actions each year initiated by grantees and reviewed by Federal officials; eliminate line-item budget management of projects: reduce indirect costs; increase research productivity and save money while maintaining accountability; and to explore the feasibility of simplifying and standardizing proposing and reporting processes and eliminating statutory cost-sharing. OMB has tasked an interagency group to guide the follow-through on the Demonstration Project along with other initiatives to improve the support relationships for university research. DOD is also participating as a member of this interagency group.

DOD LABORATORIES

Senator **Bingaman**. Dr. Kerber, why do DOD labs seem to draw such criticism for lack of productivity?

Dr. **Kerber**. We, of course, don't know what criticism you might have heard. However, in our view the DOD laboratories perform a very valuable and vital function developing advanced military systems as well as enabling DOD to be an informed purchaser of systems. Some of our laboratories have earned a well deserved reputation of world class excellence, as substantiated by the award of Nobel and other prestigious prizes to DOD scientists. Nevertheless, we recognize the need for improvements and are working very hard in areas which cause us concern. We devote special attention to the focus and direction of our technical programs. Also, we recognize very challenging problems in the recruitment and retention of high quality scientific and engineering personnel, problems which arise in large part from the reality that the civil service pay scale, as applied to scientists and engineers, is not competitive with the pay scales of industry. The issue of quality of DOD laboratory personnel is the subject of a current study we are conducting through the Institute for Defense Analysis. Also, the Defense Science Board will conduct a study this summer to evaluate and make recommendations for improvement of the DOD laboratories.

Senator **Bingaman**. Dr. Kerber, with 73 different DOD labs, it seems to me we may be duplicating some of out efforts. Couldn't we consolidate some of these labs and more effectively use the money and people?

Dr. **Kerber**. DOD goes to great lengths to assure that efforts throughout the DOD laboratories are well coordinated and complementary. We continually review the work at the laboratories, and, when necessary, we change their charters to respond to the evolution of military needs and advances. As pointed out above, this summer the Defense Science Board will evaluate and make recommendations with regard to the DOD laboratories. Should it become apparent that some consolidation could result in greater effectiveness, efficiency, and economy we would make every effort to see that such consolidation is effected.

BASIC RESEARCH IN SDIO

Senator **Bingaman**. In reviewing the SDI budget devoted to basic and advanced research, critics of the program have argued that SDI basic research programs do not provide technologies with sufficiently general applications. This argument has been used to justify shifting funds from SDI research into other DOD research accounts. Is this perception accurate? In your view, what is the potential applicability of the results of basic and advanced SDI research for DOD and the commercial sector?

Dr. **Kerber**. In all matters concerned with SDI the Officer of the Deputy Under Secretary of Defense for Research and Advanced Technology must of course defer to General Abrahamson. However, our perspective is that SDI basic research programs are very well directed toward support of the SDI mission. At the same time many of these programs will surely have broader application to other military missions and to the commercial sector. A Special Assistant in the Office of the Deputy Under Secretary of Defense for Research and Advanced Technology has been assigned responsibility for assuring that those SDI scientific, technical, and application advances which hold promise for broader utilization receive consideration for incorporation in service programs. In short, we believe that there is very high potential for SDI spinoffs to other DOD programs (and to the commercial sector), and we are working constructively with SDIO to assure that full utilization of their advances is effective.

BASIC RESEARCH OVERHEAD AND EFFICIENCY

Senator **Bingaman**. Dr. Kerber, according to your estimates, only 18 percent of DOD basic research funds went to industry and the Federally-Funded Research and Development Centers (FFRDC) in fiscal year 1986. Of the remainder, 55 percent went to the universities and 27 percent to Government labs. Has anyone in the Department of Defense looked at the comparative advantages of having basic research performed by the industry and universities, as opposed to the FFRDC's and Government labs?

Dr. **Kerber**. Within DOD we constantly evaluate the advantages in having basic research performed by the various and different performing sectors. We value the special capabilities each sector brings to our missions: the DOD laboratories have a deep appreciation of military needs; the universities provide the majority of novel abstract ideas; industry has sensitivity to the realities of manufacturing and timely application of new research results; and the FFRDC's bring great expertise in highly specilized areas. While we are concerned about balances achieved among these sectors, we nonetheless rely heavily upon the competitive process to select both the best scientific and technical ideas and the most appropriate performer. We believe that it is in the interests of DOD that all of these performing sectors be strong and vital.

Senator BINGAMAN. How do these performers compare in the percentage of research contract funds devoted to management and overhead?

Dr. KERBER. Because of considerable variations within a given sector (whether industry, university, Government laboratory, or FFRDC) it is difficult to generalize from sector to sector. For example in the university sector alone overhead percentages range from 40 percent to 75 percent (based on total direct cost, which for university R&D is mostly salaries and wages but does not include fringe benefits). Comparable figures for moderate-sized commercial firms range from 125 percent to 180 percent (based on salaries and wages, including fringe benefits). Finally, our laboratories have the lowest overhead rates, averaging at approximately 20 percent, primarily because we already own the facilities and instrumentation. Thus, differences in overhead rates stem from differing accounting practices, from differences in costs of facilities and services in different sectors and geographic locales, and from the fact that different organizations and management structures are required depending upon whether a project is a single-investigator bottoms-up university exploratory-type activity, or whether it is a highly structured and integrated industrial multi-investigator, top-down, near-term developmental activity. Whatever the case, we evaluate each proposal on its own merits, taking account of technical merit as well as management and overhead figures, and we make every effort to negotiate contracts which assure that DOD receives high value for funds expended.

Senator BINGAMAN. How do we measure the efficiency and quality of the projects undertaken by the Government labs and the FFRDC's, as opposed to those performed by industry and the universities?

Dr. KERBER. Most program managers deal with more than one of these performing sectors and are in excellent positions to compare performance. As stated above, the process of contract awards to industry, universities, Government laboratories, and FFRDCs is a highly competitive one, and each competitor, must perform effectively to succeed.

Our programs are under double scrutiny—the merit review system, which focuses on technical excellence, and the demand for usefulness to the services, which promotes relevance to service missions.

OSD hosts Annual Research Investment Strategy Reviews for each service. At these reviews performance is evaluated across the entire spectrum of organizations which perform DOD R&D.

Senator BINGAMAN. Do we have a feel for the relative ease with which the products of DOD basic and advanced research can be spun-off to the commercial sector from the various recipients of DOD research contracts?

Dr. KERBER. Yes. In general the spin-off is very direct in defense industries, most of which also pursue commercial activities. For Government laboratories and FFRDCs the process is more indirect, but nonetheless relatively effective. Furthermore, with implementation of the Federal Technology Transfer Act, we will have additional mechanisms to speed technology transfer. Because universities frequently perform longer-term, more-abstract research, the interval from discovery to spin-off is typically somewhat longer.

SMALL FIRM COMPETITION FOR RESEARCH FUNDS

Senator BINGAMAN. Small commercial entrepreneurial firms have tended to carry out much of the most innovative research in many U.S. industries. There are significant barriers keeping smaller commercial companies out of the DOD R&D business, such as Government auditing requirements and the high cost of bidding. Yet these companies could be a very effective means of spinning-off the results of DOD research into the commercial sector. Have any efforts been made by the Department of Defense to ensure that smaller, commercially-oriented companies can compete for DOD basic and advanced research funds?

Dr. KERBER. Even before the SBIR legislation, DOD identified the potential offered and then established a program to optimize the use of small, highly innovative companies. When in 1982 the SBIR legislation was passed, DOD became an enthusiastic supporter and augmented funding to small business innovative research programs. Under the SBIR program alone we have funded over 400 proposals by small businesses in fiscal year 1983, over 500 in fiscal year 1984, over 700 in fiscal year

1985 and over 1,000 in fiscal year 1986. In fiscal year 1987 we estimate that we will be committing over $200M to support R&D work with small businesses, or approximately 1.25 percent of our extramural RDT&E budget. These small businesses are proving to be effective and resourceful in their endeavors in support of DOD missions, and we will continue to tap this valuable resource. Also pertinent are our recent progress in contract streamlining and our more effective use of broad area announcements. These measures reduce time delays from proposal to contract award, a matter of special concern for small businesses, which, as compared with large corporations, encounter greater difficulties sustaining specialized research groups during lengthy contract negotiations.

SIZE OF INDUSTRY RECIPIENTS OF DOD RESEARCH FUNDS

Senator **BINGAMAN**. Do the recipients of DOD basic and advanced research funds in industry tend to be a relatively small number of large prime contractors or is some mechanism used to ensure that a share goes to some of the smaller subcontractors responsible for developing critical components for major systems?

Dr. **KERBER**. The DOD basic and advanced research funds in industry tend to be distributed across a broad spectrum of company sizes and types. This is primarily a consequence of the competitive processes employed in contract awards. Some of the large prime contractors receive relatively little support through this process, apparently because they choose in many instances to conduct such research through their IR&D programs rather than to compete for separate research contracts. Smaller firms, those without significant IR&D overhead reimbursements, have no such alternative and so compete very actively and effectively for research contracts.

COMPETITIVENESS

Senator **BINGAMAN**. Dr. Graham, in your statement you mentioned "recent efforts to facilitate private investment in commercially oriented diversification and increased competitiveness." I'm not sure I understand that. Would you elaborate? Do you mean the Government is facilitating this investment?

Dr. **GRAHAM**. As the President pointed out in his written message to Congress, the administration has taken several steps since 1982 to help commercialize the results of federally funded research, including the transfer of management of Federal technology to those closest to its invention. An Executive order is being drafted which will contain measures to enhance these efforts. The Government is facilitating this investment through policy changes and incentives to business to fund R&D activities.

DEFENSE INDUSTRY

Senator **BINGAMAN**. Recently both the Department of Defense and the Congress have supported policies designed to force the defense industry to bear a greater share of the risk on major defense programs. These measures include a reduction in progress payment rates, changes in the profit guidelines, an increase in contractor-funded special tooling and an increased use of firm fixed-price contracts. Many concerns have been raised that defense contractors will be in much weaker position to support internal basic and advanced research efforts. Gentlemen, do you feel these new policies will have a detrimental impact on our technology base?

Dr. **GRAHAM**. I do not believe that policies designed to increase the efficiency of the defense procurement process will have a negative effect on the overall defense technology base. Defense industries will continue to invest in product-related research in those areas and to the degree that it optimizes prospects for the long-term economic health of each firm. I have faith in industry's ability to do what is required to remain competitive in this regard.

Industries tend to invest research funds to solve specific problems which are deemed critical to successful competition for current and future defense contracts. Making judicious decisions on the use of Independent Research and Development (IR&D) and other research funds has always been important, but becomes even more so in a lower profit margin and higher risk environment. In such circumstances, there might be a tendency to sacrifice basic and advanced research programs to retain those associated with immediate product needs. If the Government, through judicious weighing of the IR&D evaluation criteria, as well as by encouraging the transfer of basic technologies from universities and Federal laboratories to industry, continues the appropriate emphasis on basic and advanced research, the possible adverse effects on our technology base can be mitigated.

DEVELOPMENT OF MAJOR SYSTEMS

Senator **Bingaman**. In 1981, in his book The Defense Industry, Dr. Jacques (pronounced "Jack") Gansler pointed out that the share of research and development funding allocated to R&D in the full-scale development of major systems had been increasing with a corresponding decrease in the share of funds going to basic and advanced research. Has this trend changed since 1981?

Is this a serious long-term problem for the technology base?

Dr. **Graham**. The percentage of defense RDT&E funds allocated to technology base development (6.1 and 6.2 accounts) has continued to decline since 1981. Also since 1981, these accounts have experienced nearly zero real growth. Both methods of measuring DOD's contribution to technology base development are, however, misleading in that several categories of defense-supported research are omitted from these figures. Although all Strategic Defense Initiative funds are carried in the advanced technology development category (6.3A), a sizable percentage of these funds is actually spent on research that in reality falls within the technology base development categories (6.1 and 6.2). Also, as part of each procurement action, DOD funds industry research by allowing a percent of acquisition cost to be charged as overhead for Independent Research and Development (IR&D) activities. A portion of this IR&D work contributes to expanding the technology base.

DOD must reach a balance among programs competing for scarce resources. The question of how much DOD should allocate to tech base development cannot be answered objectively. However, even considering SDI and IR&D, DOD, as the major consumer of research knowledge, talent, and facilities, has been relatively modest in its support of technology base research. Budget trends suggest that DOD perhaps should be funding a larger share of the Nation's basic research effort; and I will support an increase in these programs in future budget submissions.

RESEARCH AND DEVELOPMENT

Senator **Bingaman**. Many have expressed concern that the administration is giving low priority to civilian R&D and is failing to coordinate military R&D with civilian needs. Do you agree with that? What are your views? Do you have any recommendations?

Dr. **Graham**. In 1980, military R&D was funded at $13.6B and civilian R&D at $14.5B. The 1988 budget request funds military R&D at $46.6B and civilian R&D at $18.2. A comparison of the two rates of growth as a measure of administration priorities is not a valid basis for drawing conclusions. Clearly, defense has been the administration's highest priority, but civilian research and development has also been a priority, with continued growth during the present administration. As this administration and succeeding administrations focus on the issue of competitiveness and the role that federally funded civilian R&D plays in fostering increased industrial competitiveness, it is likely that funding for these programs will receive even higher priority.

STRATEGIC DEFENSE INITIATIVE

Senator **Bingaman**. Dr. Graham, we have been talking about the health of the technology base as it relates to the needs of defense for the country. Obviously, the Strategic Defense Initiative is very much dependent upon a strong and vibrant technology base. Is the SDI focusing enough attention in the scientific and technology areas basic to the success of SDI?

Dr. **Graham**. The Strategic Defense Initiative is a focused research program investigating essential technologies with potential for contributing to system concepts that have the capability to defend against ballistic missiles. Although all SDI funds are carried in the advanced technology development category (6.3A), a large proportion of the funds are actually spent on basic research and exploratory development efforts in those scientific and technology areas essential to advanced technology development. The Innovative Science and Technology (IS&T) program is an SDI program aimed specifically at performing research in fundamental science, engineering, and system technology related to SDI concepts. The SDI has programs to establish a base of knowledge which has every prospect of meeting our Nation's needs as the feasibility of strategic defense becomes established and we focus on system development.

[Whereupon, at 4:34 p.m., the hearing adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEARS 1988 AND 1989

MONDAY, MARCH 16, 1987

U.S. SENATE,
SUBCOMMITTEE ON DEFENSE INDUSTRY AND TECHNOLOGY,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

DEFENSE INDUSTRIAL BASE

The subcommittee met in open session, pursuant to notice, at 2:34 p.m., in room SR-232A, Russell Senate Office Building, Senator Jeff Bingaman (chairman) presiding.

Present: Senators Bingaman, Nunn, Dixon, Wirth, and Warner.

Staff present: Arnold L. Punaro, staff director; Romie L. Brownlee, deputy minority staff director; Jonathan L. Etherton, John J. Hamre, David S. Lyles, and Kent Bankus; professional staff members; and Kathleen L. McGuire, staff assistant.

Also present: Edward M. McGaffigan, Jr., assistant to Senator Bingaman; Charles C. Smith, assistant to Senator Dixon; Leon Fuerth, assistant to Senator Gore; Jim Sayer, assistant to Senator Wirth; Jeffrey Hyche, assistant to Senator Shelby; Henry D. Sokolski and Karl H. Stegenga, assistants to Senator Quayle; Alan Ptak, assistant to Senator Gramm; Samuel J. Routson, assistant to Senator Symms; and Bill Wight, assistant to Senator Warner.

OPENING STATEMENT OF SENATOR JEFF BINGAMAN, CHAIRMAN

Senator BINGAMAN. Let's begin. I understand that Senator Gramm is on his way and will be here shortly, and I understand some other Senators may also join us.

We have quite a bit to cover, so why don't we get started.

I would like to make a short opening statement and then will defer to any others on the subcommittee to do the same. Then we will hear the testimony.

The subcommittee meets today to receive testimony on the Nation's defense industrial base. This hearing, of course, along with the hearing we had last Monday on the defense technology base, is intended to provide the subcommittee with a broad perspective on the underpinnings of our national defense.

The witnesses today are Dr. Bob Costello, Mr. Norm Augustine, Dr. Jacques Gansler, and Adm. Bobby Inman. Each of them has been deeply involved in both industry and Government, and they are eminently qualified to address the issues affecting the Nation's defense industry.

Our attention today will shift to the structure responsible for translating new technology into hardware, that is, the defense industrial base.

I think it is clear that not only do we need a world class research and development infrastructure to maintain our long-term security and economic strength, but we also need a world class manufacturing capability. We need to maintain the industrial capability to translate new research developments into the weapon systems of the future and to support those systems.

A vibrant research effort cannot exist disconnected from manufacturing and product development. The migration of high technology manufacturing industry out of the United States is, of course, a cause for concern. It is a cause for concern not only for our defense needs, but our economic health as well. It is shocking, to me at least, to realize that our trade balance in high technology products has gone from a surplus of almost $30 billion in 1980, to a $3 billion deficit last year.

As my colleague from Illinois, Senator Dixon, has pointed out, we must not focus only on the high technology aspects of the industrial base, but also on the nuts and bolts in such diverse industries as machine tools, ball bearings and forgings. We must also take care that we do not forget the smaller businesses which predominate in the second and third tiers of the defense industry.

After a little thought, the conclusion becomes apparent that the defense industrial base in one way or another touches most aspects of American and foreign industry. Just as many industries depend upon the defense establishment, so, too, does defense depend upon many of our civilian industries.

One important issue that the subcommittee will take under consideration is the nature of the defense industrial strategy in this country, particularly in light of the defense industrial strategies pursued by our allies, who are also our strongest economic rivals. It is important for us here to ask the right questions and be sure that we define the correct problem.

Can we achieve a coherent defense industrial strategy? How do we maximize technology transfer from the defense to the civilian sectors and vice versa? How do we build industrial base considerations into our acquisition process, and how should we use leverage, as Dr. Costello put in his confirmation hearing, in dealing with some of the increasingly protectionist practices of our allies in the defense sector?

These are some of the questions that we will be asking at this hearing and in future hearings.

Today, Dr. Costello, Mr. Augustine, Dr. Gansler and Admiral Inman will share with us their views on these and other matters needed for our understanding of the defense industrial strategy of this country.

Dr. Costello is the Assistant Secretary of Defense for Acquisition and Logistics, at long last. I know it is a relief to him that we finally got his confirmation completed.

Prior to his appointment by the President, Dr. Costello was Executive Director of Purchasing Activities for General Motors Corporation. In this position, he was responsible for annual purchases exceeding $50 billion. During his last 2 years with General Motors, he was Chairman of the General Motors Corporate Ethics Committee, formed to establish a comprehensive policy for all employees.

Mr. Augustine is currently the President and Chief Operating Officer of Martin Marietta Corporation. He has served as the Chairman of the Defense Science Board, as the Assistant Secretary of the Army for Research and Development, and as the Under Secretary of the Army. He is presently Chairman of the NASA Space Systems and Technology Advisory Committee and a member of the NASA Advisory Council.

Dr. Gansler is Vice President and Director of The Analytic Sciences Corporation. He served as Deputy Assistant Secretary of Defense for Materiel Acquisition, and the Assistant Director for Defense Research and Engineering.

He is the author of a book entitled, "The Defense Industry," and is also a faculty member at the Kennedy School, where he teaches courses on Government acquisition management.

Admiral Inman is the Chairman, President, and Chief Executive Officer of Westmark Systems Incorporated, in Austin, TX. Admiral Inman has been the Director of Naval Intelligence, the Director of the National Security Agency, and the Deputy Director of the Central Intelligence Agency. Prior to his present position, Admiral Inman was the Chairman and the Chief Executive Officer of the Microelectronics and Computer Technology Corporation in Austin.

I look forward to the testimony. I am confident that it will help significantly in broadening our knowledge of the defense industrial base.

Before we start, let me defer to my colleagues for any statements they would like to make.

Senator Warner, thank you for coming.

Senator WARNER. Mr. Chairman, I commend you and others for holding this hearing. You have selected four of the best to be witnesses, so I suggest that we get underway.

Senator BINGAMAN. All right. Thank you very much for being here.

Senator Wirth.

Senator WIRTH. Thank you, Mr. Chairman.

I also want to thank our four distinguished witnesses, two of whom I have come to know quite well, and the other two I also look forward to hearing from today.

In your eloquent, and I think very proper, opening statement, you talked about a number of the issues that this subcommittee will face. One that we see as a kind of microcosm of all of the issues that you talked about is the action that we will be considering relating to the semiconductor industry and how it relates not only to our defense base but to our industrial base.

As I have reviewed the recommendations coming not only from the Defense Science Board task force, under Mr. Augustine's very able chairmanship, but those coming from SIA and elsewhere, there seems to be consensus that there is a problem in the semiconductor industry. But concerning what we ought to do, there appears to be very little consensus. We obviously have a difficult job of trying to build that consensus on; what kind of facility we ought to be building, if any; how do we better transfer research and development or encourage cooperation between various companies; should this be something that is done just for the semiconductor industry or should we be encouraging participation by more integrated companies, and; is increased integration and cooperation where this industry is headed? Other questions include what is the role of the Government in a semiconductor research center, if there is any role whatsover, and what is the role of the Department of Defense? Also, as you point out, what precedent do we set for other industries? If we move into this one, what does that mean for ceramics, ball bearings, machine tools, or a variety of others?

So we have a fascinating case study here with semiconductors, as you and I have discussed, Mr. Chairman. I look forward to hearing from our witnesses today on the broad issues that you outlined and specifically on the semiconductor industry. I look forward to working with you over the coming months.

Thank you very much, Mr. Chairman, for putting this hearing together and for your good leadership on this front.

Senator BINGAMAN. Thank you very much.

As a matter of procedure, why don't we first hear from Dr. Costello, with his statement, followed by Mr. Augustine, Dr. Gansler, and then Admiral Inman. If each of of you would take about 10 minutes to go through your testimony—summarize it or do it in whatever fashion you would like—after that, we undoubtedly will have some questions.

Dr. Costello, we welcome you back again. I know that this is the beginning of a very challenging period for you. We also know that preparation for these hearings is time consuming, and we are putting a great deal of burden on your schedule by calling you for these hearings, but we appreciate your presence here and look forward to your comments.

STATEMENT OF HON. ROBERT B. COSTELLO, ASSISTANT SECRETARY OF DEFENSE FOR ACQUISITION AND LOGISTICS

Dr. COSTELLO. If you would, Mr. Chairman, I would like to submit my written testimony and then summarize it.

Senator BINGAMAN. That will be fine.

Dr. COSTELLO. It is a pleasure to be here, as you know, because we did work hard to get me confirmed. [General laughter.]

It is with a great deal of pleasure that I want to discuss different ways in which we can make sure that the United States has an advanced technological and industrial base on which to build its defense needs. It is vital to our defense industry.

Not only in my present activities, but for the past several years I have been concerned about the offshore migration of manufacturing capabilities and the international and domestic industrial competitive problems facing this Nation.

It is particularly acute today in the semiconductor industry, but we will talk more about that as we progress.

The Department of Defense strongly supports President Reagan's competitiveness initiative and his efforts to seek a national consensus on solutions to this declining production base.

In DOD, we have launched five initiatives in the last several months, a key one dealing with the industrial base and what is the role of the Department of Defense. We are in the process of defining it at the present time.

A strong, robust industrial base is essential to our national security and it includes the prime contractors, subtier contractors that you mentioned, the smaller companies supporting the prime contractors, and certainly the basic industries, such as steel, petroleum and metals.

I think it is not so much that the Nation has lost technological leadership and manufacturing capability but that the rest of the world has caught up with us, and they are challenging us in this leadership role. We have to establish ourselves firmly in that leadership role again, or greatly change how we do business.

As I indicated, the semiconductor industry is highly visible. You indicated in your remarks and so did Senator Wirth that it is not the only one. There are other essential industries that are already in trouble. For example, the bearing industry, precision optics, the steel industry, and the machine tool industry, are all in trouble. And others, as the "Wall Street Journal" indicated the other day, are in trouble.

I think the machine tool industry activities we have under way may serve as a role model.

The President issued a Domestic Machine Tool Industry Action Plan to help improve our competitiveness, and when it is fully implemented, it will provide the U.S. machine tool manufacturers with improved information on DOD efforts—our needs, our requirements, and our long-term goals.

It will increase the industry's involvement with DOD manufacturing technology programs, which we think is key. We are stressing here manufacturing rather than product technology.

As part of our effort, we have put into place a request for the next 3 years, at $5 million a year, to help support the machine tool research and development activities that are being structured under the National Center for Manufacturing Sciences. In addition, we are going to provide a variety of services intended to assist the industry to improve its own industrial competitiveness. It has to be a two-way street, with both of us working together.

Solutions to these problems across the board in the country are not going to be easy, especially if you look at it from the Defense Department's perspective solely.

We are not a major factor in the marketplace for some of these items that we were 10 or 15 years ago: for example in semiconductors, as Mr. Augustine knows.

In some cases, research and development investments and the materiel acquisition programs do allow the Department of Defense sufficient leverage to promote, to be a catalyst, and to institute some national solutions. But the size and number of the problems that ultimately affect us transcend our ability to fix the problems with just DOD policies, practices, and regulations. We need other resources.

Over the past 5 years, we in the Department of Defense have made some substantial progress. They have focused some attention on this very fundamental problem. Attention has been focused on this very fundamental problem recognized relatively early-on.

Guidance was provided to the services to get on with revitalizing their industrial base planning, to develop and implement industrial base surge capacity to facilitate production expansion. But a lot more needs to be done.

In order to look at what more needs to be done, we have launched a special effort directed at revitalizing the industrial base management plan, and we intend to develop innovative ways for the Department of Defense to help restore health and competitiveness to the industries and the sectors deemed critical to national defense.

The plan will serve to integrate, in terms of today's environment, the wide variety of on-going, potential solutions to national security industrial base deficiencies. What we intend to do is to provide a roadmap in order to look at specific industries, which need attention.

We expect to find a methodology and tailor the kinds of support, the level of support and involvement by the Department of Defense.

In this process we intend to define a procedure to identify the relative roles of non-DOD participants in the other parts of the government. And most certainly, we want to look at structuring a way for industry to identify its own participation in these efforts.

We intend to increase the perspective to focus on manufacturing research and development and process technology, to strengthen the industrial base analysis and planning capability that we need in the Department of Defense, and to provide management focus on manufacturing, as opposed to the rather singular focus we have had for some period of time on product engineering.

I think it is well recognized that the Japanese have achieved their level of success in the commercial market by focusing on manufacturing technology and process technology.

We need to look at ways to encourage contractor efficiency, their quality and produceability studies. We have already undertaken ways to increase the emphasis on capital investment by changing the profit policies.

Thus, in DOD we have established a concentrated initiative to deal with manufacturing, the industrial base, and competitiveness issues. The basic goal is to create and articulate an overall DOD strategy to achieve and sustain U.S. technological and manufacturing leadership which is essential to the security of the Nation.

The establishment of a strong U.S. technological and manufacturing base is key to our whole program. We fully recognize the importance of maintaining a world class industrial base. At one time, we were world class in all fields. Today, we must find ways to achieve that world class leadership.

We look forward to working with this committee and subcommittee on these issues of national importance as the year progresses.

Mr. Chairman, this concludes my formal presentation. My written statement also includes some answers to questions listed in your letter to me.

I will be happy to address these and other questions you may wish to ask at this time after the rest of the testimony.

[The prepared statement of Dr. Costello follows:]

PREPARED TESTIMONY BY DR. ROBERT B. COSTELLO, ASSISTANT SECRETARY OF DEFENSE (PRODUCTION AND LOGISTICS)

Good morning Mr. Chairman, members of the subcommittee, and members of the panel. I am very pleased to be here with you this morning to discuss ways in which the United States can best use its technological and industrial strengths to advance our national defense goals. This is my first appearance before a Congressional committee since my confirmation, and I look forward to working with you in the months ahead to strengthen the vitality of our industrial base.

The Department of Defense is concerned about the offshore migration of manufacturing capabilities and the international and domestic industrial competitiveness problems facing the Nation. The Department of Defense strongly supports President Reagan's Competitiveness initiative and his efforts to seek a national consensus on solutions to a declining production base. Within the DOD, we have launched five new initiatives—key of which is an Industrial Base Initiative that will produce an overall strategy to serve as the basis to strengthen industries critical to the national defense.

There can be no question that a strong, robust industrial base is essential to our national security. Our industrial base serves both as a deterrent to aggression and if that deterrence fails, provides the materiel necessary to fight and win a war. It is our job to see that this base is maintained.

The full spectrum of industrial activity of the national economy is essential to defense. It consists of:

Defense prime contractors and civilian end product manufacturers who could be converted to defense production in an emergency;

Subtier industries such as forgings, castings, ball bearings, machine tools, and semiconductors;

Basic industries such as steel, petroleum, metals, ceramics, and composite fibers; and

Essential resource inputs like raw materials, energy, capital, technology, skilled manpower and management.

A critical problem facing the nation is the loss of technological leadership and manufacturing capability in industries essential to the national defense. Many of our concerns are with the subtier and basic industry structure.

The semiconductor industry is highly visible as an essential industry which is in technological and manufacturing trouble.

But it is not the only one.

Other essential industries are also in trouble. Examples include: the bearing industry; the precision optics industry; and the machine tool industry. And others are likely to emerge in the immediate future.

In the case of the machine tools industry, the President issued a Domestic Machine Tool Industry Action Plan to help improve its competitiveness. When fully implemented it will:

(a) provide U.S. machine tool manufacturers with improved information on DOD purchases of machine tools;

(b) increase the industry's involvement with the DOD Manufacturing Technology Program;

(c) support machine tool research and development [We have requested $5 million/yr in our 1988-90 budget to foster cooperative R&D in a national center for manufacturing sciences.]; and

(d) provide a variety of services intended to assist the industry and improve its industrial competitiveness.

Solutions will not be easy—especially from the Department of Defense's perspective. In many cases, DOD's needs make up only a relatively small percentage of the total market. Thus, our contracts have a relatively small influence on the private sector's behavior. However, in some cases our R&D investments and materiel acquisition programs do provide sufficient leverage to promote national solutions. But the size and number of problems ultimately transcend's our ability to fix them with DOD's policies, programs and resources alone.

Over the past five years, we have made substantial progress. For example, we have:

Provided guidance requiring the Services to revitalize industrial base planning;

Developed and implemented an industrial surge program to facilitate production expansion during an emergency;

Institutionalized the preparation of a critical items list which provides for more pragmatic emergency planning; and

Have conducted several industry responsiveness surveys relating national security requirements with industry's capacity to produce the items.

But more needs to be done.

To build on these accomplishments and to begin to harmonize them and others into an overall strategic concept, we have launched a special effort. This effort, in the form of a revitalized industrial base management plan, will develop innovative ways for the Department of Defense to help restore health and competitiveness to industries and sectors deemed critical to national security and the ability to respond to national emergencies or mobilization. The plan will serve to integrate, in terms of today's environment, the wide variety of ongoing and potential solutions to national security industrial base deficiencies. It will provide:

(a) a roadmap for validating specific industries or sectors in need of attention;
(b) a methodology for defining and tailoring the level and kinds of support and involvement by the Department of Defense;
(c) a procedure to identify the relative roles of non-DOD participants in this process; and
(d) the structure for identifying industry participation.

Tasks in the plan will seek to:

Increase Manufacturing R&D and Process Technology
Improve Education and Training
Strengthen Industrial Base Analysis/Planning Capability
Provide Management Focus on Manufacturing
Encourage Contractor Efficiency, Quality/Productibility
Balance International Cooperation Versus Domestic Capability
Encourage Capital Investment
Encourage Cooperative Ventures
Structure Effective Intellectual Property Rights
Strengthen Supplier/Vendor Capability

Thus DOD has established a concentrated initiative to deal with manufacturing, industrial base and competitiveness issues. The basic goal of this initiative is to create and articulate an overall DOD strategy to achieve and sustain U.S. technological and manufacturing leadership which is essential to the nation. We will work with other Departments and Agencies of the Executive Branch and the Congress on these critical national security issues.

In conclusion, the Department of Defense plans to continue its efforts to create an environment that fosters the establishment of a strong U.S. technological and manufacturing base which is essential to provide the level of national security desired by our citizens. We fully recognize that importance of maintaining a world class industrial base.

We look forward to working with you in the future on this important national issue.

Enclosure.

Question 1. How does DOD prioritize its efforts to improve the industrial base through the Manufacturing Technology [Man Tech] and Industrial Modernization Incentive Program?

Answer. DOD Man Tech investments are prioritized in several ways. At the Office of the Secretary of Defense and at the Military Departments' headquarters, we basically set fiscal priorities and establish major thrust areas. We rely on the Manufacturing Technology Offices in the Military Departments to establish the technical priorities within budget levels based upon their assessment of needs of the various weapon systems families being supported. We will establish a major thrust area where the scope of the technical opportunities would require an investment beyond that of any one or often a group of companies. Machine tools is one example of a thrust area. We are planning a major conference in June to establish an overall machine tool R&D agenda for this thrust area.

The main focus under IMIP is to encourage contractors to make capital investments that will result in increased productivity, improved quality, reduced DOD acquisition costs and an enhanced industrial base. IMIP is an acquisition tool applied when specific criteria are met (e.g., investments over and above what would otherwise be made, evidence of cost reductions to the DOD, etc.). Since IMIP is primarily a contractor funded program, the factor limiting its use is adequate manpower to manage the program.

Question 2. What feedback mechanism is used to assess IMIP's effectiveness?

Answer. In the micro sense, the primary feedback measurement is the savings generated by the contractor's investments. The amount of the incentive payment awarded is dependent upon the amount of these savings. In the more macro sense, the feedback mechanism has evolved over a period of time. The original feedback mechanism was a DOD Steering Group. However, IMIP became an institutionalized acquisition tool when DOD Directive 5000.44, "Industrial Modernization Incentives Program," was issued on April 16, 1986, and when an associated Guide was issued on August 26, 1986. Currently, IMIP feedback is provided by having DOD Components submit an annual IMIP Activity Summary Report indicating the level of industry's IMIP involvement. Feedback is also provided through DOD/industry conferences and industry association contacts. In addition, IMIP is one of the programs being reviewed in our Industrial Base Initiative.

Question 3. How are the results of the Man Tech program transferred from defense industries to the private sector?

Answer. It should be recognized that the commercial and defense industrial base are not two mutually exclusive industrial sectors. With the exception of military unique materiel such as munitions, DOD's basic policy is to rely on the private sector wherever possible to produce its materiel. Thus, when we speak of the "Defense Industrial Base" we are basically talking about the private sector. Most of DOD's Manufacturing Technology Program investments are actually executed through private sector contracts. Therefore, in most cases, the technology is actually developed by and initially implemented in a private sector facility.

We recognize that we must go farther than the initial contractor in order to diffuse the technology throughout the industrial base. The primary technology transfer mechanisms used are:

First: *End of Contract Briefings*—Generally, our Man Tech contracts require the contractor to demonstrate what it has done to its peers. We sponsor, nominally, about 100 of these briefings each year. A list of the tentatively scheduled briefings is compiled early each calendar year and distributed to the private sector through about a dozen societies and associations which interact with the Manufacturing Technology Advisory Group.

Second: *Technical Reports*—Each Man Tech contractor is required to prepare a technical accomplishments report. The Services distribute these reports to those companies known to be interested in the particular investment. In addition, several copies are sent to the Defense Technical Information Center (DTIC) where the report is entered into a bibliographic date base and coded appropriately so that it can be found by others researching the subject. DTIC's bibliographic data base is accessible by remote terminals from many government and contractor locations throughout the country. In addition, those reports which can be released to the public for unlimited distribution are automatically sent to the National Technical Information Service by DTIC where they can be purchased by anyone for a nominal sum.

Third: The *Manufacturing Technology Information Analysis Center* was established three years ago in Chicago. This Information Analysis Center (IAC) is one of several established by DOD in recognition that it might be difficult to find specific technical information within the vastness of DOD community. This particular IAC focuses on manufacturing technology. It has on-line access to the DTIC data bases and has created its own data base for other literature. It has also produced technical reports of interest to the DOD Man Tech community, e.g. "High Order Languages for Robotics" and "Uses of Artificial Intelligence in Manufacturing".

Fourth: Perhaps the most effective Man Tech program technology transfer vehicle is the organization known as the *Manufacturing Technology Avisory Group* (MTAG). This group provides inter-Service coordination of the Man Tech program. It consists of an Executive Committee and six Technical Subcommittees (Computer Aided Manufacturing, Metals, Non-metals, Test and Inspection, Electronics, and Ammunition). The MTAG maintains liaison with about a dozen industrial societies and associations throughout the year. The Subcommittees interaction with the groups provides the opportunity for the technical experts to discuss and exchange information of mutual interest. The MTAG also holds an annual plenary meeting attended by MTAG members and the industry groups. Nearly 600 individuals participated in the 18th Annual MTAG meeting last November.

Question 4. What is the impact of the fiscal year 1988-89 budget plans on changes in manufacturing technologies?

Answer. It should be recognized that DOD investments in manufacturing technology occur in two ways:

First: there is the explicity funded Man Tech program whose basic goal is to establish advanced generic manufacturing technology;

Second: there is the advanced manufacturing technology which must be developed to permit advances in product technology, e.g. advanced composite manufacturing processes.

Third: a large amount of manufacturing technology is developed as a "matter of course" as the result of normal manufacturing operations under DOD procurement contracts.

While we can quantify the first, we have no method to estimate the total of the other two because funds are included within the procurement contracts. The first is generally referred to as "upper case" Manufacturing Technology since it was developed by the Man Tech program while the others are usually called "lower case" manufacturing technology to indicate development outside of the Man Tech program. This semantics permits better internal DOD communication.

The DOD has requested about $170 million in for the Man Tech Program. These funds are budgeted by the Army, Navy, Air Force and the Defense Logistics Agency. This request includes $5 million for the National Center for Manufacturing Science which President Reagan included in his Domestic Action Plan to assist the machine tool industry. We are also planning to establish a major thrust area in machine tool technology in the Air Force's Man Tech program. We plan to hold a national conference the first week in June in Dayton, Ohio to help us identify and prioritize investments in this area. Representatives of the Department of Commerce, the National Research Council, the National Science Foundation, the National Center for Manufacturing Science, the National Machine Tool Builders Association and the Military Departments are all participating in this conference. We will evaluate the investments suggested by the conference attendees and anticipate using some of our Man Tech budget for high priority projects identified.

Question 5. What effect can be shown to have resulted from Defense Acquisition Initiative No. 5, "Encourage Capital Investment to Enhance Productivity?"

Answer. Defense Acquisition Initiative No. 5, "Encourage Capital Investment to Enhance Productivity" was a precursor to our manufacturing, industrial base, and competitiveness initiative. It is a collection of activities that impacted the overall industrial base area. Sub-elements were related to IMIP and Man Tech. Other elements illustrated the importance of our general cost, profit, and contracting policies as environmental factors. Accomplishments have resulted and efforts are continuing. Our ongoing efforts will ensure that manufacturing, productivity, the industrial base, and competitiveness are themes that will permeate DOD programs and decisions in the months ahead.

Our new profit policy provides incurred profits on capital equipment which should encourage greater investment. In addition, our use of multi-year contracts will provide greater assurance that investments in capital equipment will be fully recovered and reduces contractor risk for such investments.

Question 6. What efforts can be taken to improve defense manufacturing technologies and techniques, with a particular focus on production efficiencies and maintaining a viable U.S manufacturing base over the long run in critical technologies.

Answer. The Office of the Secretary of Defense recently established an ad hoc group of experts on various DOD industrial base programs. This group is taking a hard look at all of DOD's ongoing programs with a view toward strengthening them. It is also looking for voids where new initiatives may be required.

The group has initially divided its task into the following areas:

1. Increase funding for manufacturing and process technology
2. Improve education and training in manufacturing career fields
3. Encourage DOD contractor efficiency/quality/ productivity
4. Encourage productivity enhancing capital investments
5. Strengthen supplier/basic industries base
6. Encourage cooperative ventures (i.e., breakdown real or perceived barriers to cooperation)
7. Provide fair and equitable intellectual property rights
8. Strengthen DOD's industrial base analysis/planning capability
9. Provide management focus on manufacturing
10. Balance international cooperation vs. domestic capability

Each of these will be refined into more manageable pieces and the entire list could be redefined if a more meaningful structure becomes evident. The group is also using a disciplined methodology to identify the Nation's top industrial base experts. Once identified, these individuals will be invited to join us in formulating an overall DOD industrial base strategy. This group will be called together early this summer.

Senator **Bingaman**. Thank you very much, Dr. Costello. We will go through all of the witnesses before we have any questions. But we have two additional members of the subcommittee who have come in.

I would just ask, Senator Dixon, if you have any opening comments that you want to make before we go on with the testimony?

Senator **Dixon**. Thank you, Mr. Chairman. I have a statement that I have placed, with your leave, in the record.

Thank you very much.

[The prepared statement of Senator Dixon follows:]

Prepared Statement by Senator Alan J. Dixon

Mr. Chairman, I am very pleased to take part in this hearing. Dr. Costello, Mr. Augustine, Mr. Gansler, and Admiral Inman are all widely recognized as experts on today's topic. Their comments on the state of the defense industrial base are most valuable, because, as I recently stated on the floor of the Senate, I believe our defense industrial base is deteriorating before our very eyes.

We need to work toward solving this problem immediately. Our defense has become dangerously dependent on foreign parts. For example:

More than 80 percent of military semiconductors are assembled and tested abroad;

90 percent of all strategic ball bearings under 30 millimeters are imported;

The M-1 tank is made with printed wiring boards from Mexico, Taiwanese hybrid circuits, and optical glass also made outside of our borders.

Domestic producers of these parts are disappearing. The sub-tier contractors, the foundation of our defense industrial base, are disappearing despite the fact that domestic prime contractors are thriving. As the 1985 General Accounting Office report—"Assessing Production Capabilities and Constraints in the Defense Industrial Base"—states, "Prime contractors have relatively few production constraints while sub-tier contractors face many." The longer we wait to face this problem, the further the defense industrial base deteriorates.

This is not new information. Congress has been discussing this issue since 1976. We have debated the defense industrial base problem. Now is the time to address it.

I am currently drafting a comprehensive legislative strategy to restore the industrial base to its needed capability. Consequently, I am eager to hear our distinguished witnesses' views on how best to accomplish this goal.

Thank you, Mr. Chairman.

Senator **Bingaman**. Thank you.

Senator Nunn, did you want to make any comments?

Chairman **Nunn**. No, Mr. Chairman, except to say that I think this new subcommittee is off to a really good start with this panel of witnesses. It is a tribute to you that we are having this look at such a very important subject. It is also obviously something that is on the minds of a lot of people, and if we did not have a lot of interest in it, you would not have this distinguished panel here today. These are key people with vast experience in this field. So I congratulate you.

Senator **Bingaman**. Thank you.

All right, Mr. Augustine. Go ahead, please.

STATEMENT OF NORMAN R. AUGUSTINE, PRESIDENT, MARTIN MARIETTA CORP., AND CHAIRMAN, DEFENSE SCIENCE BOARD TASK FORCE ON DEFENSE SEMICONDUCTOR DEPENDENCY

Mr. **Augustine**. Thank you, Mr. Chairman and members of the committee.

With the committee's permission, I would like to submit my formal statement for the record and speak extemporaneously for a few moments.

Senator **Bingaman**. That is fine.

Mr. **Augustine**. It has been my privilege over the years to appear before this committee at least a dozen times. I would assert that on no occasion have we dealt with a topic that is more important than the one with which we deal today. In particular, I would like to discuss the health of the semiconductor industry in some detail.

It provides, as Senator Wirth said, a very good case study for the overall problem we address.

I suspect that some years from now, when we look back upon this period today, the mid-to-late 1980s, we will find that it was a turning point for American industry—a turning point at which we either maintained the world leadership we enjoyed in the past, and regained that leadership in the case of some industries; or else we will find that it was the time when we lost our leadership, with resultant deterioration of our economy as a whole and certainly our ability to defend ourselves.

It may well be that one can build a financial system based on a service economy. I feel certain that it is not possible to base military strength, or the ability to fight a war, on a service economy.

In fact, at the height of World War II, one may recall that our industry was building some 50,000 tactical aircraft, 20,000 tanks, 80,000 artillery pieces, and half a million trucks a year. We built 9,100 tactical aircraft during 1 month of the war. And we were building liberty ships in 50 days, from laying down the keel to launching.

Since that time, we have gradually seen our ability to manufacture in large quantities deteriorate. As Secretary Costello said, the Defense Department must depend to a very great degree on our commercial sector to provide the wherewithal for defense mobilization.

The Defense Department, in my judgment, cannot go it alone ensuring the health of U.S. industry. I think it is to the Defense Department's credit that it at least has selected a few key industries and has tried to focus on helping in those cases. In my opinion, the semiconductor industry is probably the most important of those.

We have been losing our ability to manufacture in quantity, whether one is talking about the steel industry, the ball bearing industry, machine tools, steel, aluminum, semiconductors, what have you.

What does this mean to national defense?

I think, first of all, it means that we are likely to be outnumbered in terms of our military forces in peacetime. This is a strategy we have chosen. We have chosen to depend on technologically superior, quantitatively inferior forces.

Second, I think it means that we are losing our mobilization capability.

Third, it means that we will have to count more and more on technological superiority. But it is likely that at least in some industries, particularly the high tech industries, that as manufacturing leadership moves offshore, technological leadership is likely to follow.

I would like at this point to discuss the semiconductor industry very briefly because I think it is an important case in point. Also, in the judgment of the committee which I had the privilege of leading, it is the most highly leveraged industry affecting national defense. It makes a greater difference in the quality of our weapon systems than any other single industry that we can find.

I should say at the outset, by way of disclaimer that my own firm is not a member of the semiconductor industry. We build a few semiconductors for our own use. We do not sell them to other firms or sell them commercially.

About a year or a year and half ago, the Defense Department became sufficiently concerned about the health of the semiconductor industry that it asked the Defense Science Board to set up a task force to investigate that situation.

As I said, it was my privilege to chair that group.

The membership of the group included 11 people who were members of the National Academy of Engineering and 7 former presidential appointees. It included the individual who invented the integrated circuit and the individual who is generally credited with first commercializing the integrated circuit.

I think it would be the unaminous opinion of that group that the semiconductor industry today is in a very serious state of testing. What happens in the next year or two, we concluded, will have a great deal to do with whether it survives as a broad, healthy industry or retreats to become a niche industry.

National defense, as I said, is very heavily dependent upon the capability of the semiconductor industry, since it is on that industy that our computers and many of our other systems depend.

Semiconductors make the difference in a great many of the defense systems that our task force studied.

Furthermore, the pace of change in the semiconductor field is such that one moves to an entire new generation of components about every 2½ years on the average. Therefore, if you are 5 years behind in this industry you are two whole generations behind.

Fortunately, I should say that the Soviet Union is about two generations behind us in this area. On the other hand, the Soviet Union has by and large—but not entirely— relied on very large quantities of military equipment to offset our technological leads.

The semiconductor industry was a true made-in-America industry. The transistor was invented in America and the integrated circuit was invented in America. It is an industry that has reduced its cost by a factor of 100 in the last 10 years, cost by unit of capability. It is an industry that has invested heavily in research and development—heavily by U.S. standards, about three times the U.S. industrial average—as a percent of sales. But this has by no means been sufficient investment in terms of the rules of the world marketplace, with those rules now being set increasingly by nations on the Pacific Rim, and in particular Japan.

In order to look at the current health of the industry, I would cite one particular semiconductor device, the dynamic random access memory or DRAM, which, in many respects, is the bellweather of the industry. It is the largest quantity item, and the income from that underpins the research for future generations of semiconductors. This product also places major challenges on manufacturing technology.

Today, we have less than a 10 percent share of the world dynamic ram marketplace. In 1970, we held almost 100 percent. Today, there are only three U.S. firms making the latest generation of chip. There are eight Japanese firms.

On the first major generation of chip, there were 14 U.S. firms. Of the three remaining U.S. firms, two are captive houses that sell only to themselves for use in their own end products. Only one sells in the general marketplace, with devices available to the defense industry and other segments of the economy.

The causes of this decline are varied, and I will only say that they probably began with the disparity in wages between U.S. wages and wages in the Pacific Rim, causing U.S. companies to set up assembly plants and test plants overseas. The difference between the yen and the dollar over the years has been a factor. Today that is a much smaller factor.

Dumping probably also has been a factor. But I think we would deceive ourselves if we thought that it was a principle factor or anything approaching that.

Our panel concluded that the principal cause of the difficulty we suffer today in the semiconductor industry is that the Japanese set a long-term goal for themselves and they brought together all the resources at their disposal, namely their government, their industry, and their academic institutions, to pursue that goal.

We would suggest that that goal was not simply controlling the semiconductor industry, but was a far broader one of using the semiconductor industry as a means to an end, namely, to control the information industry.

As I am sure this committee knows, the information industry today is the largest industry in the world. It is about $400 billion today. It will be about $1 trillion by the year 2000. The extent of U.S. participation in that market in our judgment, will depend very heavily on how well we fare in the semiconductor industry, which is at the very heart of the computer industry, the telecommunications industry, commercial electronics, and all those other components that make up the information industry.

What can we do about this trend to reverse it?

The task force thought long and hard about many alternatives. By and large, we are not believers in subsidies and we are not believers in trade barriers. On the other hand, these are extraordinary circumstances.

The group concluded that the best option available to us for the semiconductor industry was for that industry to form a consortium of firms that would work in the area of manufacturing technology. The consortium would provide jointly developed technology to member firms so that they could apply the technology in their own plants to compete, with their own end-products, against other manufacturers, principally foreign manufacturers.

As Senator Wirth suggested, there is a growing understanding that we indeed face a problem. There is less consensus that the solution we proposed is the best one. I would be the first to say that if someone else has a better solution, our group would enthusiastically stand and applaud.

We do feel, though, because of the short time constant of the industry, where a year, 2 years, or 3 years can be the difference between being competitive and not being competitive at all—that it is very important for this Nation to do something very soon.

Again, I think it is to the credit of the Defense Department that it addressed this problem and is, under Secretary Weinberger's direction, working very hard today to come up with an action that the DOD itself can take.

Mr. Chairman and members of the committee again, I thank you for letting me talk about what is a somewhat onerous subject, but one that I believe is of extreme importance. I would be happy, when the time comes, to answer any questions the committee might have.

[The prepared statement of Mr. Augustine follows:]

PREPARED STATEMENT OF NORMAN R. AUGUSTINE, CHAIRMAN, DEFENSE SCIENCE BOARD TASK FORCE ON DEFENSE SEMICONDUCTOR DEPENDENCY

Mr. CHAIRMAN. Members of this distinguished committee. It has been my privilege to appear before the Committee on the Armed Services and its Subcommittees on a dozen or more occasions, yet I can think of no time when the subject was of greater import than the one we address today.

The subject of the ability of the U.S. semiconductor industry in particular, and U.S. industry in general, to support defense needs as well as compete in the world economy is among the most crucial questions before the country at this time, and perhaps in our entire history. We may well be at a juncture that historians will one day view as a turning point. I welcome the opportunity to be here this afternoon and hope I can contribute in some small way to our very significant deliberations.

In my opening statement, I would like to offer some general observations on the overall topic of our defense industrial base, which I have described in the past as our "industrial order of battle." Then I will turn to the specifics of a recent study of the semiconductor industry by a Defense Science Board Task Force, of which I had the honor to be chairman.

Traditionally, we Ameicans have been able to think of this Country's mighty industrial capability as perhaps our greatest weapon in any conflict. During World War II. President Roosevelt very accurately talked about the arsenal of democracy, and that indeed is what our industrial base has been ever since, for our own armed forces and for our allies as well.

As I recall, the Navy said its secret weapon in that war was its supply train, which is another way of describing the stream of equipment and materiel developed, produced, and delivered once wartime industrial mobilization had taken hold. I believe a flag officer in that period offered the observation, "I'm not sure what you mean by logistics but I want more of it."

Even today, the production figures are worth recalling. At the height of World War II, U.S. industry demonstrated its potential by producing 50,000 aircraft, 20,000 tanks, 80,000 artillery pieces and 500,000 trucks a year. More than 9,100 aircraft were produced in the single month of March 1944. By that time the nation's shipyards were building liberty ships in 50 days, and a total of 5,200 large oceangoing vessels were produced by the war's end.

I was reminded of the remarkable World War II production level and its results just the other day by an anecdote I came across in a magazine. The author related that when he was a young man, serving in the U.S. Army, he was assigned as a guard at a prisoner-of-war camp. One of the prisoners was a battle-hardened German lieutenant who spoke excellent English.

The writer asked the lieutenant, "If you're so tough, and if you're all superman, how come you're here captured and I'm guarding you."

"Well, it's like this," the prisoner answered. "I was on this hill as a battery commander with six 88-millimeter anti-tank guns, and the Americans kept sending tanks down the road. We kept knocking them out. Every time they sent a tank, we knocked it out. Finally, we ran out of ammunition, and the Americans didn't run out of tanks."

The United States aimed for quantity, achieved quantity, and quantity certainly played a major role in victory in the second world war. I believe a good case can be made that our adversaries in Europe deployed better quality equipment, more advanced equipment, in many cases than we did. But any discrepancies that existed were overcome, at least in part, by the greater quantity of material that we and our

Allies finally brought to bear. So far as Japan is concerned, historians have suggested that the attack on Pearl Harbor might never have occurred if it had been evident to the rules of Japan in 1941 that the United States was prepared to fight a prolonged war with full military mobilization.

Today we face an entirely different set of circumstances. Our primary potential adversary outnumbers us very substantially in military manpower and most weapon systems. We are not talking about advantages of 10% or 20% but whole orders of magnitude in some areas—almost a 4 to 1 advantage in the number of tanks, for example, 2.6 to 1 in artillery, 1.4 to 1 in combat aircraft, 1.4 to 1 in strategic delivery systems, and so on. The manpower advantage is on the order or 2.5 to 1. Viewed in terms of Warsaw Pact forces compared to NATO, the results are similar although the differences somewhat lessened.

Rather than quantity, today our military forces depend heavily on technological superiority to deter war and to win in combat. For some years technology has been the key to our security and to our strategy. The "technological order of battle" has joined the "industrial order of battle" as a critical factor in the national security equation.

In my view, we are presently in danger of losing valuable ground in both areas. The Soviet Union by all accounts has been conducting a vast research and development effort as part of its overall military program, in addition to acquisition of Western technology. The result, to quote the Department of Defense's current assessment of Soviet military power, is that "While the United States continues to lead the USSR in most basic technologies, the gap in the application of such technologies continues to narrow."

Obviously, overall United States industrial capacity remains far superior to the Soviet Union's. The contrast is even more striking when you compare the combined economies of the United States, its European allies, and Japan with the combined economies of the Warsaw Pact. In terms of Gross National Product, for example, the combined GNP for the U.S. and its allies is on the order of $7.5 billion compared to approximately $2.7 billion for the Soviets and their Eastern European allies.

In view of the existing Soviet superiority in quantities of equipment, there may be some question whether the overwhelming free world industrial potential could be a factor in the "come as you are war" some specialists have posited. The concept that we have production capacity "in our hip pocket" could be illusory as a result of the time available in a given situation. Nevertheless, there is no question that the industrial balance vis-a-vis the Soviet Union remains strongly in our favor, depending on how we as a nation choose to utilize this advantage.

At the same time, Mr. Chairman, we are living in a much altered world. We Americans have become all too familiar with such concerns as trade deficits, lagging productivity, diminished competitiveness in the global marketplace, and the decline of some U.S. industries as the result of a variety of frequently interrelated factors.

These changes in the economic environment here and overseas also affect, and I would say potentially threaten, our industrial base so far as defense needs are concerned. I am thinking of such industries as steel, aluminum, shipbuilding, machine tools, ball bearings, and many others.

The logic train is that success in the marketplace betokens long-term commercial viability which contributes to the industrial base. The converse, unfortunately, also is true. In the case of a technology-intensive industry, the corollary is that the loss of commercial strength also generally leads to a loss of technological leadership as well, in a vicious circle that further diminishes national defense potential. You may be able to support a nation with a service economy, but I'm certain you cannot fight a war with a service economy.

If an industry moves offshore, even to an allied nation, the crucial question becomes whether we as a nation should be satisfied to depend on a foreign supplier—given the uncertainties of international politics over the long haul coupled with the risk of disruption or interdiction in times of crisis. I am not prejudging the answer to that question in all cases and in all circumstances. It is, however, one that I believe we must face with the realization that, as production moves offshore, it is not uncommon for technology to follow it.

The semiconductor—also variously known in its most common form as an integrated circuit, a microchip, or simply a chip—presents an example of a made-in-America technology and industry now very seriously threatened by overseas competition, primarily from Japanese firms and others on the Pacific rim. Semiconductors are essential to advanced weapons and are among the keys to the technological superiority required by our armed forces.

Because of these considerations, the Department of Defense initiated a study by the Defense Science Board about a year ago to examine the impact of trends in the semiconductor industry on national defense. The Deparment, I might note, also is currently examining industrial readiness as affected by other industries.

The DSB Task Force, under my chairmanship, has completed this study and recently issued a report on "Defense Semiconductor Dependency." My comments on this subject are the product of the Defense Science Board, which is strictly an advisory group. Our recommendations are being considered by the Department and will become policy only if accepted after appropriate consideration.

I also should point out that my company, the Martin Marietta Corporation, is not itself a part of the semiconductor industry. We design a certain number of chips, manufacture a smaller number for specialized uses in defense systems, and participate in research to meet such special needs. But, by and large, we are customers for chips on behalf of our customers—the various services and agencies of the government.

The Task Force findings underline the fact that the U.S. semiconductor industry, which literally created its market and dominated it until a few years ago, is indeed under stress today.

One critical indicator is the so-called "bellwether chip," the dynamic random access memory or DRAM chip. The market share of U.S. manufacturers in this area has gone from 100% in 1970 to well under 10% today and continues to decline.

The U.S. share of the worldwide merchant semiconductor market, or open market, also has been declining steadily—from nearly 60% in 1975, to below 50% in 1985, to below 45% in 1986. Japan's share over the same period has increased from 20% in 1975, to 40% in 1985, to slightly more than the U.S. 45% share in 1986. The merchant market in general, and the DRAM market in particular, are of primary relevance to defense needs, because the former generally comprises the defense supplies and the latter is the highest volume segment of this manufacturing-intensive industry.

The most advanced generation of memory chip is today being produced by eight Japanese firms but only one U.S. merchant firm and two U.S. "captive" firms.

The trend is clear and it has several other aspects. Possibly most critical of all is the fact that R&D in the U.S. semiconductor industry also is lagging. Further, the U.S. once dominated the vital semiconductor manufacturing equipment industry, with a market share of more than 90% in the early 1970s. The U.S. share now is less than 50% by most measures and declining rapidly as another significant capability moves offshore. Perhaps the best known U.S. supercomputer, the Cray, has 100% of its memory chips and 10% of its logic chips made in Japan.

From the Defense Science Board's point of view, the state of the U.S. semiconductor industry assumes critical importance because:

(1) Sophisticated semiconductors are essential in the whole range of defense systems from early-warning satellites to battle tanks, from frigates to fighter bombers, from smart projectiles to strategic weapons. We cannot build modern systems without semiconductors, and without incorporating continuing technological advances in each new generation of equipment.

(2) The defense market is now less than 10% of the overall market for semiconductors, although as recently as the 1960s a large percentage of the semiconductors produced went into defense systems. Today electronic chips provide a major example of the migration of new technology from defense and space to the commercial economy. Therefore only a commercially successful industry can be a dependable, modern, long-term supplier for defense systems.

At present, we found, most microchips incorporated in U.S. weapon systems are produced by U.S. companies. If the present decline in market share and resultant industrial vitality continues, however, there appears little question that defense manufacturers will have to turn to overseas suppliers and accept overseas dependence for these essential components. In our DOD study, we concluded that this option was unacceptable, given the critical nature of semiconductors and of semiconductor technology, which averages a new generation of chip every two or three years.

While the Task Force's mandate, and primary concern, were the defense implications of this subject, the group also reached the parallel conclusion that the purely economic aspects were of immense import in themselves. The semiconductor underpins the entire, broad information systems industry, which is a $400-billion industry worldwide today, is expected to be a trillion-dollar industry by the year 2000, and potentially will be the most important segment of the U.S. economy in the 21st century.

The Task Force offered several recommendations intended to restore and enhance our competitive role in the semiconductor marketplace. The most fundamental recommendation is to establish a Semiconductor Manufacturing Technology Institute as a U.S. industry consortium, with capitalization by its member companies and support by DOD through contracts over the next 5 years for development of critical production processes, equipment, materials, and devices. In essence, this would be a generic manufacturing technology organization with emphasis on transferring the results to the production lines of the member organizations.

While providing facilities for production of selected devices for DOD needs, this institute would advance the technology base for efficient high-yield manufacture of semiconductor devices. As the Task Force report points out, such an institute could have an important impact not only on DOD but in the significantly related commercial market as well when member firms transfer technology to their own applications.

I will not linger over the Task Force's other recommendations in detail except to say that the unifying goal in every instance is increased technological and competitive thrust through utilizing the capabilities of the range of government agencies concerned along with industry and the academic world. For example, the Task Force proposes that semiconductor science and engineering centers should be established at eight universities, building on current National Science Foundation, DOD, and commercial consortium programs. In addition to conducting research and development, these centers would train a new generation of qualified students to provide the technical expertise and technical leadership that will be required in this field for a great many years to come.

There may be other potentially effective approaches to the problems of the semiconductor industry. The one I have described is the approach that our DSB study recommended. I am not prepared to suggest that similar approaches may be necessary, appropriate, or even effective in other industrial or technological areas. We looked at one very specific, if broadly significant, industry with its own set of circumstances and we suggested solutions that may not be readily transferable or applicable elsewhere.

With that, I will conclude my prepared statement. I look forward to continuing this discussion in response to any questions you may have.

Senator **Bingaman**. Thank you very much, Mr. Augustine.

Jacques Gansler, go right ahead, please.

STATEMENT OF DR. JACQUES S. GANSLER, VICE PRESIDENT AND DIRECTOR, THE ANALYTIC SCIENCES CORP.

Dr. **Gansler**. Thank you.

I also would like to read into the record my prepared statement and summarize some of the key points of that.

I go back to the recent studies that have been done, trying to form the basis for things like the Packard Commission and the Goldwater-Nichols bill, which indicated what the major problems are in the way we do business. They specifically identified four adverse trends.

One is do we select the right systems and plan for them properly?

Second is the high and growing costs of equipment.

Third is the long acquisition and development times and the long time to deploy them.

Fourth are the growing problems in the industrial base itself.

It seems to me that there are some very encouraging actions that have been initiated to try to address the first three of those problems; all of which are, basically, are on the demand side, if you will, of the way business is done.

But there have not been any real initiatives taken on the overall military-industrial complex, the supply side. We barely have begun to address the supply side problems.

Now, if you try to figure out why that is, I think it is because we have been living under a period of false assumptions; two specifically. One of the assumptions is that there is a normal free market operating in this area, that automatically adjusts to achieve efficiency and responsiveness. Second is that the strategic industrial responsiveness, namely our industries' capacity to surge or mobilize in times of crisis, can be separated from our peacetime operation and, therefore, we can ignore it during times of peace.

The former assumption, namely that of a free market, I think is invalid, because most of the normal conditions in the defense industry are those of a single buyer and one, or at most two, suppliers. Thus, in that unique market environment that we have, I think the government has to exercise its monopsony power in a responsible fashion, and that means to create some proper incentives for the effective operation of the industrial base.

In the second area of assumptions, namely that you can put off till wartime the responsiveness issue, I think it is very clear that the only way you are going to get responsiveness is to take actions during peacetime. For example, if you want to surge on a production line, you might order the long-lead parts a year in advance. This would have an advantage, from economic considerations, for quantity buying; it would also have an advantage from the strategic responsiveness viewpoint.

Now, in 1980, right before the administration came in, there were a series of important studies that were done to highlight the problems, in terms of both economic efficiency and strategic responsiveness in the industrial base. They noted things like a lack of parts suppliers, increased lead-times and rapidly rising parts costs, a lack of capital investment and, basically, an overall lack of visibility into the growing problems of the industrial base in terms of efficiency and responsiveness.

Over the past 6 years, there has been a much-needed buildup in spending for weapon systems but, unfortunately, we did not simultaneously address the industrial base problems—partly, I think, because of the assumptions I just listed before.

Thus, in my opinion, we are in the same situation today that we were in 1980 in terms of the problems in the industrial base, but things have, in fact, gotten worse. There are new problems that have been added.

Two of these to which I would like to call your attention specifically, and touch on, are these. One is the growing foreign dependency that has been building up over the last few years. Second is the so-called "industry-bashing" that has been going on by the executive and legislative branches.

In the first of these, Norm's study and others have shown the very critical dependence on many sole source offshore suppliers of critical defense parts. What is particularly alarming to me is the critical technology areas where the necessary next generation—not the current generation—parts are going to be developed offshore. We will have a loss of technological leadership and an inability to compete effectively in many of these areas.

Areas noted in some of the studies were precision glass, computer memory chips, silicon for high powered switching, liquid crystal and luminous displays, advanced gallium arsenide devices, and I could go on.

The second of the problems is the deterioration in government-industry relations. I think this can be traced to a series of actions by the legislative and executive branches over the last few years which, in my opinion, have had an incredibly negative effect on the Nation's ability to maintain a strong defense industrial base.

Let me briefly list some of the things that have been affecting the industry: greatly reduced profit policy; delayed and reduced progress payments; 3 to 4 years' delay for auditing and payments on completed work; cost sharing on high risk research that is only applicable to DOD; long stretch-outs in the time to award contracts; delays in awards due to protest procedures; abuse of suspension and debarment; fixed price contracts for high risk development; increases in disallowances for incurred costs. You could go on with the list, and I have a longer list in my actual prepared testimony.

Perhaps most significant about this is competitive awards for low bids, instead of best value.

The effect of this long list of actions, which have been building up, as I said, is a breakdown in the business relationships between the DOD and its industrial suppliers and, in turn, their suppliers. Perhaps most critical is the long-term impact on innovation, on R&D and professional services, the so-called ideas portion of the defense industrial base.

To strengthen the overall industrial base, we first have to reverse the trend, I think, of this industry-bashing. The executive and the legislative branches have to recognize the value to them—and I honestly do not believe they do today—of a strong, competitive, innovative, and responsive defense industrial base. If they recognized the importance to them, then they would address the necessary actions to encourage, rather than discourage, the strengthening of the industrial base.

The United States is the only nation in the world of any influence that does not recognize its defense industry as a valued national resource, and act accordingly.

I believe very strongly that fraud and abuse have to be vigorously attacked and penalized; but waste has to be addressed through structural change, not through larger numbers of detailed, and often counterproductive, regulations, audits, inspections, and public attacks.

The second of the required broad changes is the implementation of a specific defense industrial strategy. I would propose, specifically, a five point strategy.

First, I believe we need an R&D investment strategy. Currently, the major share of our R&D dollars is devoted to major weapon systems. I think we need to complement that with an R&D strategy that emphasizes components, materials, techniques, and, as Bob Costello said, particularly manufacturing technology and advanced production processes.

This would be using our advanced technology to focus on the lower tiers of the industrial base and reducing the cost of future weapon systems, as a complement to the R&D on the next generation of weapon systems that is coming along.

To me, it is inexcusable that, for example, this year the Army zeroed out their manufacturing technology funding. I think that is not a strategy.

I believe, by the way, that money is not the issue here. The National Academy just came out with a study that recommended something like $300 million a year for manufacturing technology investment. We are spending a lot more than that on pet projects in this area, that are not focused in terms of any coordinated strategy.

The second focus of our industrial base strategy I believe should be the replacement of regulations with natural incentives to improve the quality and lower the costs of our systems. Here, many things, such as continuous competition between alternate sources, improved profits for improved performance, and more source selection based on better performance rather than lower bids, would go a long way toward strengthening our industrial base.

I also believe that we need to look here at the commercial techniques that are used in the way their business is done, where it might be applicable.

But perhaps the third step, which is bringing in the commercial area directly, is even more necessary—namely, to achieve some greater integration of our civilian and military production capability.

Here, numerous studies have shown the possible benefits of using commercial components, say, in the electonics area, by the DOD. Other examples would be the sharing of production facilities between the DOD and the commercial world so that we can get a rapid conversion and/or a rapid surge in our capability.

It would also allow us to share the manufacturing equipment between the civilian and the military and, therefore, encourage capital investments even more.

Fourth, I think we need to implement our industrial strategy on our major weapon system programs. Too often, we will say we have a strategy and then, on specific programs, not go along with it, in terms of which factories we use and which programs we encourage as a time phased use of these programs to stabilize our industrial base.

Last, and perhaps most critically, is for the Chairman of the Joint Chiefs and the policy side of the DOD to actually begin to make industrial strategy part of our national security posture. Speeches and policy statements in this area do not do any good unless they are translated into actions that show up in the budget.

That is the proof that one really cares about an issue, and today we do not see those investments being made.

In the correlation of forces, America's strength clearly rests on its industrial power, to balance the overwhelming quantities of Soviet systems. Thus, if we are going to bring industrial strength up to being an equal partner with our tactical and strategic forces, we have to address the funding question directly.

I have written about each of these five industrial strategies, industrial base initiatives, elsewhere, and I would be pleased to amplify on them during the question and answer period. However, I want to stress that, in the short-term, the DOD needs to take two steps. One is to achieve greater visibility into the problems, particularly at the lower tiers; and, secondly, to direct someone and/or for someone to take the initiative to start to move out, as Bob Costello just indicated it was his intention to start doing.

In conclusion, it is very important to note that the idea of an industrial strategy for the Defense Department is not at all revolutionary. Our leading economic competitor, Japan, has explicitly stated a five point defense industrial strategy not at all unlike that which I just went through. In addition, we well know that the Soviet Union places top priority, both in peacetime and in crisis responsiveness, on its defense industry.

Perhaps most significant, however, is that the United States already implements a defense industrial strategy. Unfortunately, it does it through the many uncoordinated and often contradictory actions, of both the Congress and the DOD, that daily affect the industrial base.

What is essential is for us to develop and implement an effective industrial strategy, one geared to our unique economic and political system; namely, competitive markets and democratic balances.

Such a program would not only have a positive effect on the Defense Department, it would also have a very positive effect on our overall Nation's economy, since defense is a major player in that economy, both in the R&D and in the production direction.

In my opinion, the time to act on this issue is now. Our Nation's security requires it, and I think the taxpayers deserve it.

Thank you, Mr. Chairman.

[The prepared statement of Dr. Gansler follows:]

PREPARED STATEMENT OF DR. JACQUES S. GANSLER*

STRENGTHENING THE DEFENSE INDUSTRIAL BASE

In this age of insecurity, a strong national security posture is essential. Numerous recent analyses (for example, the one done by the Packard Commission and the one leading up to the Goldwater-Nichols Defense Reorganization bill) have indicated that there are serious problems in the defense acquisition arena. If we are to get a significant increase in our national security posture for our expenditure of over $300 billion a year, four adverse trends must be reversed. They are: (1) increasing evidence that "the system" does not always result in the selection and development of the right weapons; (2) the high (and ever growing) unit cost of each of our weapons; (3) the long acquisition cycles for the development and deployment of our new weapon systems; and (4) the growing problems in the defense industrial base itself.

It is encouraging that corrective actions have been initiated—at least in the Executive Branch—to address the first three of these problem areas, but more needs to be done. It remains to be determined whether the initial "appearances" of change within the Executive Branch are substantive improvements or simply changes of form. Additionally, Congress has yet to take internal actions to complement these Executive Branch steps. Nonetheless, real progress has at least been initiated to address the problems on the demand side of the overall "military-industrial complex." Yet we've barely begun to address the problems on the supply side—the defense industrial base.

To understand why this perspective has been ignored to date, it is perhaps necessary to recognize that public policy decisions in this area are based upon two false assumptions; namely, (1) that a normal, free market is operating in this area to maximize efficiency and responsiveness, and (2) that the issue of strategic industrial responsiveness, meaning industry's capability to surge production or mobilize in times of crisis, can be treated as separable from the peacetime operation of the industrial base. The former assumption is invalid because the normal condition for defense procurement is essentially a single buyer (the Department of Defense) and one, or at most two, suppliers of any given weapon system. Thus, in this unique market environment, it is necessary for the government to exercise its monopsony power in a responsible fashion—through *creation* of proper incentives for the effective operation of its industrial base.

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As to the second assumption, if the government desires to have a responsive industrial base, it must take actions *in peacetime* to prepare it for rapid response in times of crisis. These actions should be considered at the same time as actions are being taken to achieve economic efficiency in the peacetime production of each weapon system. (For example, a decision to order long-lead production parts as an economic efficiency action—through multiyear buying—would concurrently increase industry's responsiveness to a demand for a surge in production—through the availability of added quantities of parts.)

In 1980 our defense industry problems were the subject of numerous studies. These highlighted problems such as the lack of surge capability, excess capacity at the prime contractor level, a growing lack of parts suppliers, increasing lead times and rapidly rising parts costs, a lack of capital investment, and overall, a lack of visibility into the growing problems of industrial efficiency and responsiveness.

Over the past 6 years there has been a much-needed buildup in spending for the acquisition of weapon systems. Unfortunately, we did not simultaneously address defense industrial base problems—undoubtedly, in part, because of the two false assumptions that I noted above. Thus, we are in a situation today where the problems identified in 1980 have simply grown worse; and where some important new ones have been added. Two of these are particularly noteworthy; namely, the growing foreign dependency for critical defense parts, and the so-called "industry bashing" by the executive and legislative branches. In the first of these areas, a series of recent reports (from the Defense Science Board, the National Academy of Sciences and Engineering, the Joint Logistics Commanders, and the National Security Council) has shown that many critical weapon system components are produced *sole-source* outside of the United States, and that this trend is worsening. What is particularly alarming is that in many critical technology areas the necessary next-generation parts are being developed offshore. With this loss of technological leadership, the United States will lose its ability to compete effectively in these areas in the future. This is the case for precision glass, computer memory chips, silicon for high-powered electronic switching, liquid crystal and luminous displays, advanced gallium arsenide-based semiconductors for high-speed data processing, and advanced fiber-optics products—and the list is growing.

The second new problem—the deterioration in government-industry relations—can be traced to actions by the legislative and executive branches that have had an incredibly negative impact on the Nation's ability to maintain a strong defense industrial base. Some of these are: a greatly-reduced profit policy, delayed and reduced progress payments, three- to four-year delay for auditing and payments on completed work, "cost sharing" on high-risk research that is only applicable to DOD, long stretchouts in the time to award contracts, delays in awards due to the new protest procedures, abuse of suspension and debarment procedures, fixed price contracts on high-risk developments, increases in "disallowances" for incurred costs on government contracts, abuse of proprietary data rights, encouraging professional and technical service companies to bid based at 60- to 70-hour work weeks while paying them for only 40 hours (called "uncompensated overtime"), continuous budget uncertainties on programs, program stretchouts that *require* inefficient development and low-rate production, and—most critical—making competitive contract awards for "low bids" instead of best value. The effect of all of these actions (which have been building up over the past few years) is a breakdown of the business relationship between the DOD and its industrial suppliers, and their suppliers in turn. Perhaps most critical is the long-term impact on innovation—on R&D and professional services—the "ideas" portion of the defense industrial base.

To strengthen the overall U.S. defense industrial base, we must first reverse this recent trend of "industry bashing." The executive and legislative branches should recognize the value, *to them*, of a strong, competitive, innovative and responsive defense industrial base; and they must address the actions necessary to foster this. The United States is the only nation of any influence in the world that does not recognize its defense industry as a valued national resource. "Fraud and abuse" must be vigorously attacked and penalized; but "waste" must be addressed through structural change, not through larger numbers of detailed—and often counterproductive—regulations, audits, inspections, and public attacks.

The second of the broad changes required is to achieve the needed structural changes through implementation of a specific defense industrial strategy. I would propose specifically a five-point strategy. First, we need *an R&D investment strategy*. Currently, the dominant share of our R&D money is focused on the development of new weapon systems. We need an investment strategy that complements the weapon system R&D work by emphasizing components, materials, techniques and, particularly, manufacturing technology and advanced production processes. This use of advanced technology to focus on the lower tiers of the industrial base and on reducing the cost of future weapon systems is particularly critical now, as we are about to enter a whole new generation of advanced weapon systems. (To me, it is inexcusable that the Army "zeroed out" its manufacturing technology budget. That's not a strategy, it's just giving up.) Money is not the issue here. The dollars are relatively small—the National Academy recently recommended an annual program of around $300M. We spend far more today on numerous "pet projects" in the manufacturing and capital equipment area. What's missing is a long-range, coordinated strategy.

The second focus of our industrial base strategy should be *the replacement of regulations with natural incentives to improve quality and lower costs.* We should pursue such thrusts as continuous competition between alternate sources, improved profit for improved performance, and more source selections based on better performance rather than lowest cost. These changes would allow the government to reduce the amount of regulation, which has been found to be an ineffective technique—and, at the same time, get far greater performance and lower cost equipment out of its industrial base. The payoffs would be achieved by allowing the DOD to utilize the normal market incentives that have been found to be effective in the commercial world.

The third step necessary is to *achieve greater intergration of our civilian and military production capability.* By making far greater use of available commercial components (electronics, for example) and by sharing military and commercial production facilities, we will be able to get better use out of our advanced manufacturing processes and capital equipment, as well as to provide a rapid means for conversion, should crisis response require it.

Fourth, we need to *implement our industrial strategy through our major weapon decisions.* If we apply industrial strategy, as one input to these decisions, we will make far greater use of the large resources we allocate to defense. For example, this approach would mean addressing "where" to most effectively build new weapon systems—rather than just which ones to build. With excess capacity, we need to more efficiently use the few modern plants that we have, rather than pour dollars into modernizing out-of-date plants. Similarly, we might decide to broaden the industrial base, in selected part supplier areas, by funding multiple sources on a particular weapon system. Or—when we have only a few facilities in a given industrial base sector—we might decide to "time phase" the start-up of major weapon systems, so as to maintain a more stable and competitive labor force in that particular sector. Such considerations simply do not enter into most of DOD's—or Congress'—major resource decisions.

Fifth, and perhaps most critical, is for the Chairman of the Joint Chiefs and the policy side of the DOD to actually *begin to make industrial strategy part of our national security posture.* Speeches and policy statements don't do a bit of good, unless they translate into actions that show up in budget items. That's the proof that one really cares about an issue. In the "correlation of forces," America's strength clearly rests in its greater industrial power (to balance the overwhelming quantities of Soviet systems). Thus, we need to make our industrial strength an equal partner with our tactical and strategic forces. A solution could be "hedging-off" funds for industrial base actions, rather than forcing the military to trade off a strong and responsive industrial base against "a few more weapons procured this year".

One extremely important ongoing initiative in this regard is a DOD proposal to establish a system of Industrial Alert Conditions, or INDCONs. This system, somewhat equivalent to the current DEFCON system, would create a systematic structure of industrial enhancement options that could be instituted early in a crisis, to help utilize our economic strength. This system was mentioned as a major industrial base policy initiative in the most recent DOD annual report, and deserves support.

I've written about each of the above-noted five industrial base initiatives elsewhere; and I'd be pleased to amplify on them during the question and answer period. However, I would stress that the short-term steps for the DOD are to, first, achieve greater visibility into the problems of the industrial base—particularly at the lower tiers—and to, second, make a clear (but high-level) delegation of organizational responsibility for developing and implementing an industrial strategy. (It would seem logical for Dick Godwin and Bob Costello to take this leadership role.)

In conclusion, it is important to note that the idea of an industrial strategy is not revolutionary. Our leading economic competitor, Japan, has explicitly stated a five-point defense industrial strategy not unlike that described above. Similarly, our leading military competitor, the Soviet Union, is known to have a national strategy which places top priority on both the peacetime and crisis responsiveness of its defense industry. Most significantly, the United States already implements a defense industrial strategy—through the many uncoordinated, and often contradictory, actions (of both the Congress and the DOD) that daily effect the industrial base. What is essential is for the United States to develop and implement an *effective* defense industrial strategy; one geared to our unique economic and political system (of competitive markets and democratic balances). Such a program would have a positive effect not only on our national security posture but it would also enhance the Nation's overall economic posture. When one recognizes that more than one out of every ten manufacturing workers in the United States are involved in defense, and approximately one out of every three scientists and engineers, it becomes clear that the implementation of this strategy could also have a very dramatic, positive impact on the nation at large. In my opinion, the time to act is now. Our Nation's security requires it and the taxpayers deserve it.

Senator BINGAMAN. Thank you very much, Dr. Gansler.

Admiral Inman, go right ahead.

STATEMENT OF ADM. BOBBY R. INMAN, USN, RET., CHAIRMAN AND CHIEF EXECUTIVE OFFICER, WESTMARK SYSTEMS INC.

Admiral INMAN. Thank you, Mr. Chairman.

I apologize that I do not have a formal statement for the record. I am running Westmark very austerely, until I have some companies in a positive cash flow.

Senator BINGAMAN. We should do that with the Government.

Admiral INMAN. In reading the backup materials that Tom King pulled together for me out of my old files, I found a memorandum that I wrote to Norm Augustine almost a year ago for the Defense Science Board on my views on semiconductors and my strong conviction that we had to look at that in a much larger framework, the impact of all of electronics on defense.

So I had some copies of that made at the hotel on the way, which I will leave with you for whatever potential value those wider, more deeply developed thoughts might have for you.

[The information follows:]

COMMENTS ON THE SEMICONDUCTOR DEPENDENCY ISSUE

The Task members seem to agree that dependency on foreign technology and manufacturing capability is a more critical issue than dependency upon particular semiconductor devices. The latter can be stockpiled for the early years of system life. By the time the stockpiles are depleted, the manufacturing technology for the parts should be easy to acquire. However, in a free market situation the research and development funding is a direct function of market share and profitability, both of which are rapidly declining for U.S. manufacturers. In fact, the semiconductor market is not totally free. The Japanese government intervenes to support its perceived economic needs. We are struggling with the question: "Should the U.S. government intervene in order to satisfy its defense needs, and if so, how?"

I am concerned that an attempt to answer this narrow question by itself might delay the consideration and resolution of much more fundamental problems. We need to consider the question in the context of two broader issues. These are: (1) the cost and effectiveness of the industrial base for national defense, and (2) the relationship of this cost and effectiveness to our competitiveness in the commercial sector. The Japanese have demonstrated a remarkable ability to determine their long range needs. They also have exercised the will and the management ability to develop and execute plans to meet these needs. As Dr. Bobrow noted, they disclosed these plans publicly twenty years ago.

I agree with Mr. Love's comment that the United States should be far more concerned about eventually having to buy a solid state phased array radar in Japan than about buying a few chips. However, I don't agree that we are talking about a few chips. We are talking about a multibillion dollar semiconductor industry whose

R&D base is at risk. But we must keep in perspective that the defense budget is fifteen times larger than the entire semiconductor industry.

In simple terms, national defense requires platforms, weapons, and command and control. At one time platforms were based upon dual use technology, and the United States had strong commercial industries which supplies an industrial support base for both ships and aircraft. Now, however, the commercial shipbuilding industry in the United States has disappeared, and as a result, competitive forces no longer drive either costs or technology. The defense department pays for all research and development and pays very high prices for ships and submarines. Fortunately, we still have a strong industrial base in commercial aviation. However, that base is largely separated from the military aircraft business. The Federal Government pays for almost all of the R&D that supports military aircraft production, and there are no commercial pressures to improve manufacturing methods or to lower manufacturing costs. This contributes to the high cost of military aircraft.

Electronic subsystems are major contributors to the cost and the performance of both weapon systems and C^3I systems. Twenty years ago the United States was dominant in both commercial and military electronics. In fact, from World War II until the present day, our military superiority has depended largely upon this dual dominance. However, following the trend set in ships and aircraft, this position has eroded, and that erosion is accelerating. In the commercial sector, European and Japanese companies are rapidly increasing their market share in consumer and industrial electronoics. In many cases (television, VCR's computers) they have done this by first manufacturing for U.S. labels, and later under their own brands. Again, the military market has become so separated from the commercial market that the manufacturing techniques and pricing practices have become irrelevant. At some point, the R&D will become irrelevant. At that point, we will have a military electronics industry, wholly supported by the federal government, with no useful fallout from the commercial sector. Obviously, that will be enormously expensive, as is our military aircraft industry.

Unfortunately, the story will not end there. The next generation of commercial electronics manufacturing technology will be able to produce military electronics which are far more capable and cost effective than we can produce with today's technology in today's obsolete factories. At that point we will be forced to design subsystems around foreign technology, and have electronic boxes built overseas by foreign suppliers—not for cost reasons, but for performance reasons.

Now we are concerned about semiconductors. Again, a commercial manufacturing area once dominated by the United States is slipping away. Again we are faced with the dilemma. Should the United States develop a military oriented capability which depends totally upon the federal government for both R&D and market? Should the government subsidize an industry which may become less competitive and less self sufficient every year? What will be the long term effects of our actions?

The United States must reassert itself in electronics manufacturing in order to make its defense capability effective and affordable. Semiconductors are a small but critical part of this issue. Electronic systems—communicators, industrial applications, computers, and consumer products—are the market for semiconductors. That market was and is Japan's target. Japan entered the semiconductor market to enhance its competitiveness in electronics. They announced that strategy twenty years ago. We can learn from their example. The Japanese believe that economic success depends upon manufacturing superiority and market share. They concentrated their semiconductor capability in an oligopoly of large electronics firms—NEC, Hitachi, Toshiba, Fujitsu, Matsushita, Mitsubishi and Oki Electric. Those companies have the necessary resources, the staying power, the engineering skills, and the manufacturing expertise. They also are vertically integrated and therefore have the applications and the marketing leverage. They do not have to sell out to foreign ownership the moment their venture capitalists lose heart. These companies were required to make major long term commitments in order to participate in government sponsored research programs.

Semiconductor processing equipment is as vital to a national capability in electronics as machine tools are to a capability in automotive and industrial equipment. The Japanese subsidized both of these enabling industries in various ways, all of which were described to this task force. We must find ways to subsidize these same industries in ways which will increase, rather than decrease their effectiveness. One way is through user consortiums fostered by and subsidized by the U.S. Government.

The idea behind a user consortium is that the industrial users of equipment are best able to set requirements for advanced equipment or tools, and are highly motivated to see that they are developed quickly and priced affordably. Because the equipment makers are not vertically integrated, they lack the capital and the motivation to subsidize their own R&D. Government participation is needed to provide incentives for participation by both users and equipment makers. There is a natural distrust between competitors at both levels. This distrust markedly slows the formation of a collective enterprise, and in this case, action is overdue. Japan has demonstrated that properly applied subsidies can promote the necessary cooperation, while maintaining a competitive atmosphere in the long term.

We also must insure at least a constant flow of R&D dollars into semiconductor manufacturing in the U.S. in the face of a dwindling U.S. market share. Here we must decide whether we should apply those resources to the merchant semiconductor industry, to the defense industry, or to national facilities. Any one of the three could be a losing proposition. The viability of the merchant industry in all but niche markets has been questioned. Should we subsidize a company which may be sold to foreign investors next year? Should we invest the money in the defense industry? Soon we will have invested a billion dollars in the VHSIC program. With the possible exception of Texas Instruments and Motorola, this investment has not improved the viability of the merchant industry. Japanese integrated circuits soon will have VHSIC performance and will be far more affordable.

National laboratories have been successful when there was no alternative commercial market. This is the case for high energy physics and for many types of munitions, including nuclear weapons. National laboratories probably cannot compete with a healthy, competitive commercial industry either in the U.S. or elsewhere.

Either a consortium(s) or an oligopoly of vertically integrated companies would be effective. The latter is the Japanese approach. It would require a higher level of cooperation and commitment than has been the rule in the U.S. IBM is the only vertically integrated company which comes to mind, and it does not attempt to compete in semiconductors. Motorola and Texas Instruments have a considerable degree of vertical integration and are leading semiconductor merchants. Other leading U.S. merchants would have to merge, or at least team with electronics companies.The consortium might jointly staff and build a facility. The government could subsidize the effort either by leasing the facility or by providing research grants. The member companies would provide a substantial portion of the research funds and would provide a portion of the researchers. The idea of a consortium is attractive because many companies can participate in the research, and there can be greater dissemination of the results than is possible through an oligopoly. A large number of DOD contractors who are not merchants, but who have captive semiconductor operations would stand to benefit. The question is whether the members can turn the results into products quickly enough to gain a competitive advantage. Perhaps a combination of a consortium and a subsidized oligopoly would be best. The consortium might include many other companies outside the oligopoly. It could perform basic research as well as applied research, and the results could be made available to both vertically integrated and non integrated companies.

Whichever approach is taken, it is paramount that we pursue a variety of technologies and that we strike a balance between short term and long term R&D. Silicon, gallium arsenide and indium phosphide all are important to DOD. Charge coupled devices, charge injection devices, and schottky barrier devices are important for imaging technology. VLSI signal processing architectures and algorithms are critical to DOD C^3I systems as well as to small weapons and to electronic warfare. Microwave and millimter wave technologies are important to radar. Solid state power devices are needed for both communications and radar. Optoelectronic device technology is critical, as is solid state display technology. Electronic packaging is important. Advanced integrated circuits cannot be used effectively without advances in interconnection technology.

An obvious question is: Isn't this collection of technology requirements too broad to deal with? The answer is: Not for the Japanese, who have figured out how to exploit these technologies commercially. In each of these areas commercial Japanese technology threatens to eclipse the best U.S. military technology. The DOD is supporting all of these technologies to a degree, but this support is through individual companies and the results are not readily available to non-participating companies, whether defense contractor or commerical. Most defense R&D contractors have little incentive to share meaningful research results, no matter how contracts are written. A true technology base for the defense industry is not being developed effectively. The DOD cannot afford the duplication of effort and the restriction of dissemination which are implicit in its current contracting methods for R&D.

Research cooperatives by themselves are not the answer. At MCC we struggle with the problems of technology transfer and the support of technology after it is transferred. Typically, during the early phases, there is a reluctance on the part of shareholders to make firm plans to exploit the research because of lack of trust that "external" research will be successful or useful. Sometimes there is no active receptor capability which can quickly convert the research to an in-house capability. However, as the relationship matures, these problems tend to diminish. There also is the risk of having all of your eggs in one basket. Any single group or organization is likely to overlook ideas or approaches which could turn out to be important. It would be best to have multiple consortia for a problem as critical as semiconductor technology.

Still, the real issue is time-to-market. We have tended to discourage the commercial exploitation of DOD sponsored R&D. The VHSIC program is an example. The VHSIC CAD and packaging efforts are promising exceptions to that example. We should seriously consider the advantages of rapid commercial exploitation of technology to the national defense. The case of CCD's, as described by the Fairchild representative is particularly disturbing. A technology, sponsored by DOD, and developed in the United States, rapidly found its way to Japan where it was improved upon and vigorously exploited. Now it is generating sufficient R&D funds through profits on television camera sales that the United States will have difficulty keeping up with the technology. This same technology is absolutely critical to the manufacture of weapons targeting systems and to smart munitions. It still is not obvious whether we should have classified that technology, or whether we should have provided incentive to someone in the United States to exploit it before the Japanese did. However, for the future, the answer is clear. We are not going to keep the Japanese out of these technologies by classifying them. Our challenge will be to achieve parity with Japan in all of these areas, given that their R&D will be fueled by profits from multi-billion dollar commercial applications.

The government's contribution to semiconductor R&D might be funded by a use tax on semiconductors and upon imports which contain semiconductors. This would tend to make the R&D funds a percentage of the total U.S. semiconductor market, independent of U.S. market share. The suggestion that U.S. suppliers sell commercial chips to DOD at prices of high reliability JAN parts and pocket the difference for R&D sounds like asking the oil industry to voluntarily contribute excess profits to charities of their choice. On the other hand, the premise that R&D technology should go to the companies who can exploit it quickly is a sound one.

The problem we all observe is that, as the Japanese semiconductor technology and manufacturing improve, we become more dependent upon their circuits in our systems because it makes sense from a cost, quality and performance standpoint to put them in. Moreover, our own manufacturers, including AT&T, insist that they cannot package chips economically in the United States, no matter where they make them. The trend is toward dependency, not away from it. That dependency can be compensated for. Our real problem is to find a way to avoid dependencies at higher levels and to avoid dependencies for the technology itself. Without that technology, we cannot design and build our own systems.

Whether or not we complain about dumping and about unfair trade practices, the Japanese are winning the integrated circuit war with manufacturing equipment and technology, and they are combining this with first class research and first class design. But they are not winning by much. The U.S. semiconductor industry is modernizing their equipment and methods far more quickly than any other industry, and they are reinvesting capital and R&D more aggressively than any other industry.

As I stated above, Electronics manufacturing is an even larger problem for the U.S. Sony and Matsushita are putting more advanced manufacturing technology into compact disks and VCR's that we see in any U.S. system outside of the IBM 3090 computer. And NEC's packaging technology for the SX supercomputers and the new ACOS 2000 mainframe is more advanced than IBM's. NEC is using a substrate technology in production which is still in the laboratory stage in the United States. U.S. military electronics manufacturing, hamstrung by specifications and special requirements, has not improved significantly in many years. The inspection systems required by these specifications preclude the use of modern assembly systems. As a consequence, military electronic equipment gets more expensive at the same time commercial equipment is getting cheaper. DOD's manufacturing modernization programs demonstrate that DOD is aware of the problem and is trying tc fix it. However, the Japanese, unhampered by antiquated restrictions and aggressive in their capital investment, are driving down costs faster than we can comprehend. At the same time, they have made "made in Japan" a symbol of quality. Even in the commercial electronics area we are lagging well behind. The solution to this problem is not within the scope of this task force. However, it is imperative that we call attention to it. Solving the problems of semiconductor technology and manufacturing will not help us if we cannot build electronics cost effectively.

Admiral INMAN. Let me build on what my colleagues here have had to say.

I am persuaded that we must look at the lessons of history as well as our current problems as we seek some solutions.

We set out in the early 1960s to totally change the way we went about the defense procurement process. We were focused on cost, and developed a process by which, with careful use of cost effectiveness techniques and operations research, we could make wise decisions and save money.

In a world where there was no sense of urgency for the products of that process to flow into operational hands, nor where there was any worry about a world of an international marketplace, the process worked, though fitfully sometimes. Basically, it worked.

I believe in the 1980s we have to recognize that the process simply does not work in the world in which the United States finds itself.

We have a process that looks at cost but does not comparably look at quality, and certainly does not look at time.

We have a procurement cycle that now runs 12 to 13 years as the standard. When we set out to reform it, it ran 4 to 5 years.

Why do I focus on that? It is because increasingly I hear calls, even from my esteemed colleagues working on the Council on Competitiveness, that what we need is to refocus and put more of our effort on civilian R&D, as opposed to that which is being spent by defense.

Well, first I have some objection to trying to label most basic research as either civilian or military. When you begin the process, you are pushing the frontiers of science; and if you go back and look at the historical record 1946 to 1960, you will find that, supported by the Armed Services and Appropriations Committees, the Department of Defense was the primary source of funding not only for basic research, but also creating a pool of talent. It was the primary source of grants for graduate studies and for equipment.

It was only when we turned to try to refine the process that we decided that defense should not, in fact, make those investments but, rather, should much earlier decide that they were going to focus only where they could see a prospective use for the weapon system. You can chart from 1968 the beginning of the decline of the pool of talent. But I believe you can also begin to find the crippling effects on defense itself, as we too narrowly defined too early what our long-term needs in the way of technology might be.

One of the things we lost along the way was any sense of urgency in turning technology into usable systems or usable products.

In the period when the cycle was 4 to 5 years, you had access to the technology early for commercial exploitation.

It is very hard to do that with a cycle that runs 12 to 13 years and for all the worries about the transfer of technology to potential adversarial use in other countries.

I believe we need to go back and take a fundamental look at the time urgency for moving technology into systems, to build in incentives to do that, and to accept that we will have some mistakes along the way in the process. But I believe the country, at large, would benefit, and I am certain defense would benefit by accelerating the process, accepting that there will be some mistakes, and focusing on the speed with which technology is turned into usable systems.

This mandates a major focus on manufacturing technology. You cannot do it unless you focus on the tools by which you turn the technology into usable systems, fast with absolute quality and cost controls.

Japan learned that lesson purely in looking at commercial opportunities, and it is largely through their skill in turning technology into products with absolute quality controls that they have made their successful inroads in this marketplace.

Two years ago, I shared the view that if we could just get the value of the dollar down, we would solve a lot of our problems. Well, we have had 2 years to watch the process. It worked pretty well against the yen and the mark. But what we suddenly discovered was about 51 percent of the trade is with countries whose currency it is still pegged to the dollar, and so we are not getting any impact.

But for Japan and West Germany, the trade deficit is still high. The only reasonable explanation I can find is the perception, if not the reality, on the part of the American consumer that the quality of their products is superior, and a willingness to pay more for quality.

We are going to have to stand back and take a fresh look at the whole process by which we look to move technology into the broadest possible uses.

I am not adverse to defense providing incentives for that. I am reluctant to see defense set out to pay all the costs. I do not think that is achievable. But I think it is achievable to build in incentives that let us focus on where we have the best prospect of using the technology faster for military purposes, for all the advantage that gives over our military adversaries, and having that technology available for commercial exploitation at the earliest possible time.

I would hold forth at great length, but you have been patient to sit through a lot of presentations, and I suspect you have a lot of questions. Those will give me a chance to make the points I have not already made.

Thank you.

Senator BINGAMAN. Thank you very much, Admiral Inman.

Why don't I ask a few questions now. I think what we will try to do is to have 10 minutes of questions per Senator and then go around again.

Let me start with Mr. Augustine.

HELPING THE SEMICONDUCTOR INDUSTRY

There was an article in the paper this morning which you may have seen, in the New York Times, discussing the criteria by which government should decide to intervene or not intervene to help the semiconductor industry. The article argued that industry leadership is not united behind the proposal that you came up with in your group under the Defense Science Board. I would be interested in your reaction to that. To what do you attribute lack of a united industry position? How crucial is it that we have a united industry position—or maybe we do have one? But if we do not, to what extent is that essential if we are going to succeed in doing anything useful?

Mr. AUGUSTINE. Mr. Chairman, I did not see that particular article, but the semiconductor industry, of course, is made up of people who are principally entrepreneurs—at least it is led by those people. They tend to be strong individualists. They have come through a period of extreme competition with one another.

So it is not surprising that you do not have perfect unanimity.

Also, our report has only been out for about 6 weeks, which has not offered a great deal of time to resolve differences.

I would be inclined to look at the glass being half full rather than half empty. I think there is unanimity over the fact that we have a serious problem and we have to do something differently.

I think there is amazingly strong agreement throughout the industry that some kind of collaborative effort involving Government, industry, and academia, is required. I think the only differences that I can detect tend to be on the details of that collaborative effort, and by "details," I mean to what extent one gets involved in very high volume production, as opposed to high volume production, and some matters like that.

So I find an encouraging amount of agreement actually and believe that we may be on the threshold of being able to take a step with this collaborative effort.

Senator BINGAMAN. Thank you very much.

Let me change the subject a little and ask Dr. Costello this question.

We sometimes feel that we are acting at cross purposes here in the Congress, probably because we are.

FUNDING RESEARCH BY ALLIES

One area that concerns me is that we seem, through some of our defense programs, to fund research being done by our allies. I am particularly thinking of the SDI program. We have had some debate about whether it is appropriate for us to fund our allies to do some of that research. They gladly do it, in my view at least, partly to get the commercial spin-offs that benefit from that. We find ourselves now being asked by the Department of Defense—well, not yet, but perhaps in the near future—to fund research and activities in this country to keep our industry competitive with foreign countries where we are also funding the research.

Is that a problem? Are we in danger of funding both sides of this technological race?

Dr. COSTELLO. That goes back to one of the statements I made before. We are no longer the technological leader worldwide in everything we need.

I think that we have to take a broader look today, because we do not have all of the technical resources here in the United States to meet all of our needs in some unique areas.

I think that when we enter into those programs, we must take that long view and insure that that technology is transfered to our industrial base by the time we are finished.

Then there are programs, such as the semiconductor industry, that are well defined.

We have funded very specific work, like VHSIC, and MIMIC, two significant programs in the semiconductor industry. We have already said for the 1988 and 1989 period that we will put aside at least $50 million a year, and I think that recognizes the need for our involvement in and support of that high tech industry.

It is one of the basic pillars that we have to look at.

Let me expand on that for just a second.

MACHINE TOOL INDUSTRY

We also took a leading role in the machine tool industry. If Defense had not gotten there at the right time, I do not think we would have had an activity in which those very same machine tool entrepreneurs would have formed a consortium, in this case the National Center for Manufacturing Sciences.

So there is that very key role that we have to play, and we seeded that with some money. But I think, more importantly, we said that we are committed to the industry working together in those types of consortia.

Senator **Bingaman**. I guess the point I am really trying to get at is shouldn't we be requiring our allies to bring some technology resources to these joint research programs themselves, if we are going into these joint research programs with our allies?

Dr. **Costello**. I think that is what we are asking them to do, to specifically utilize that technology in the programs and the specific application we want.

They have science and technology. We have identified it, and we have said now let's work out a program to bring that to bear on the specific nature of the requirement we have.

I think it is using our leverage, again, to ensure that it ends up here to our advantage.

Senator **Bingaman**. In reference to using our leverage, I am somewhat concerned about the offset policy that some of our allies seem to have. I have noticed the recent AWACS situation, both with the British and the French. My understanding is that Boeing was able to sell AWACS thereby agreeing to buy 130 percent of the value of the AWACS from producer-suppliers in both England and France.

It is very clear that the Ministry of Defense in Britain and the equivalent in France have a clear national policy on offsets, which they work assiduously to enforce, but we seem to have none.

Is this a problem? Should we have an offset policy to ensure that we do not get into the business of buying 130 percent of foreign products in order to be able to then sell 100 percent?

Dr. **Costello**. Offset policy is a commercial practice, and it is a part of the negotiations that are done between the companies and the foreign governments.

Senator **Bingaman**. But it is the foreign governments.

Dr. **Costello**. Yes, it is the foreign governments.

Senator **Bingaman**. I mean, it is a practice between our companies and the foreign governments. I am just wondering if there should be a policy between the foreign companies and our Government.

Dr. COSTELLO. I think during my confirmation hearings, Senator Exon raised a question somewhat similar to that. I said that anything we can use for leverage, we should use, and offsets are a form of leverage.

It is not our practice at this time. It involves more than the Department of Defense by far.

Senator BINGAMAN. Does anybody else on the panel wish to comment on that?

Admiral Inman.

Admiral INMAN. You could see me jumping up and down in my seat, I guess. [General laughter.]

Again, I come back to my basic test: what is the breadth of the use we make of the technologies that we have created?

Defense investment in VHSIC technology I think was absolutely first-rate. But, as I have looked for its use, with the possible exception of Texas Instruments and Motorola, I do not see any impact out in the merchant industry. In fact, Japanese integrated circuits will soon have VHSIC performance, and they will be far more affordable.

I think we really do have to come back to the basic issue, not should we make the investment—yes, we should make the investment; but what has to parallel it is how are we going to make sure that there is the broadest use of that technology? That keeps this industrial base viable.

The point that I keep circling around is the sense that if we do have viable commercial marketplaces for much of the technology, the cost for defense is going to be astronomical. Split it into platforms, weapons, knowledge, and command and control. Weapons are not in any other market, only in military sales. But both for platforms and for the command and control and the knowledge gathering and using, there are clearly commercial applications for much of that same generic technology.

In shipbuilding, we lost our commercial side of that a long time ago. In aircraft, we still have it, though I worry even there about splitting away from the base, for the commercial aviation and the military aviation feeding one another.

The electronic industry—here we have not yet lost the battle, but we are headed in the direction of losing it, if we do find a way to keep a constant focus on the commercial use of it as well as the military applications, and early.

Senator BINGAMAN. Thank you very much.

My time is up.

Senator Wirth.

Senator WIRTH. Thank you, Mr. Chairman.

Thank you, all. That was very distinguished testimony from each of you.

Let me, if I might, turn to the specifics of the semiconductor industry and perhaps pick up where Norm Augustine left off.

I would ask each of you if you agree with what seems to emerge as agreement related to this problem: one, that a problem exists; second, that in order to solve the problem, some kind of collaborative effort is necessary; and third, that the problem is essentially one of manufacturing capability.

So, one, does the problem exist?

Second, to solve it, are we going to need some kind of collaborative effort?

Third, is it fundamentally one of manufacturing capability?

Mr. Augustine, maybe I could ask you to start. Does the agreement go at least that far among all the players?

Mr. **AUGUSTINE**. Well, I pretty well had my chance to express myself. My answers to those would be yes, yes, and yes.

Senator **WIRTH**. Thank you.

Dr. Gansler.

Dr. **GANSLER**. Well, I think clearly that is a problem and, clearly, some form of a cooperative, collaborative effort is required.

INTEGRATING COMMERCIAL AND MILITARY ELECTRONICS

I agree with Admiral Inman that the problem goes well beyond simply deciding to either set up a plant or make a joint investment. We need to look at the way in which commercial and military electronics integrate. There was a Defense Science Board study this summer that said defense does not even know how to buy existing commercial parts. So it goes well beyond just the fact that you need a collaborative effort for this particular investment. I think it goes to the heart of why can't DOD use commercial parts today if they are better and more reliable and at lower cost?

Definitely some form of collaborative effort—I would go, as I say, right into the spec and standards and other parts of the system, to have DOD use more commercial systems and parts as well.

MANUFACTURING AND PRODUCTION CAPABILITIES

Now, the manufacturing capability I would have worded differently. I do not think it is a current capability issue as much as it is a next generation manufacturing capability question. I think in terms of the particular thrust of their initiative, it is geared toward next generation manufacturing technology, and I would even stress more process technology than I would the capability.

I am not personally convinced that whether you build it in that plant is the issue. What is the issue is whether or not the collaborative effort focuses on next generation manufacturing technology and processes.

Now, the problem is that the DOD has historically in some cases invested in next generation systems, and ignored the question of the production capability.

So we developed a technology, and then it goes offshore, and then we buy them.

So you do have to worry about the way in which it gets back into the industry. But I think if you look at the combination of a more integrated military and commercial industry and an investment that is expensive, high risk, and long term, and that has to be made, I think, partly by the government; if you combine those two, the manufacturing technology investment and the integrated industry (commercial and military), I think you would have a solution that would work.

Senator WIRTH. Thank you.

Dr. Costello.

Dr. COSTELLO. I could give you a quick answer of yes, but I would like to expand on it.

The problem certainly exists, and I believe it is not confined to the semiconductor industry. It is broader than that. It is one in which we emphasize process and manufacturing technology in the United States versus the rather high focused product technology that we have been able to enhance our efforts with to date.

It has changed. So we have to go back to the fundamentals of how do we make it once we have decided what it is.

On the second item, whether it takes a collaborative effort or not, I think many of the programs we are looking at are going to force us to do business in a different way. There are few companies that have the technical resources or even the financial resources to go it alone. So it says that some type of new, innovative way of dealing with industry and giving them incentives to work together, in consortia, is going to be upon us.

The third, manufacturing technology is key because we must be able to demonstrate it and use it broadly—not just for defense. Otherwise we do not have a broad enough base to get to the next level of technology.

So I believe that so far the three of us are very much in agreement.

The last issue of broad-scope manufacturing capability is key. We are at the point in the semiconductor industry where we really have to look at some of the fundamentals. What are the theoretical limits to the size of the device, and to the size of a line, so that maybe we will find ourselves almost to the end of that street. We must also take a different avenue with our fundamental research efforts. Then we can split it off and say there is a new technology.

So I strongly support it and say yes, and thank you for allowing me to elaborate.

Admiral INMAN. Senator Wirth, I am basically in agreement with the definition.

The semiconductor problem, fortunately already has been defined enough so that we can come to grips with it. There are other problems that have to be addressed. But I would hate to see you sort of put it aside and say let's wait till we develop everything to solve this.

We can buy a lot of chips and stockpile those. But what we cannot stockpile is the manufacturing capability, when we get into the crisis, and we have to produce follow-on chips.

The good news is that the market is moving away from mass memory chips to custom chips. So the lead that the Japanese have built up we, in fact, have the potential of regaining, if we focus on the right kind of future needs and not try to solve the problems that are already behind us.

Senator WIRTH. The question that now comes along on your point, Admiral, is this. It seems to me that we do not want to put this aside. This is a relatively discreet and well defined problem, and if we can figure out how to go about solving this and the collaborative arrangements between the private sector and its relationship with the DOD—if we do that well on this one—it seems to me that it is going to help with the next problem that may come down the line.

So, therefore, how we approach this is very, very important. As you point out, let's not get all confused with putting this aside with all the other ones. Let's see if we can really think our way, grind our way through this one and do it right.

If you all agree yes, yes, yes, the next question is: do you share the sense of urgency that came out of the DSB reform, that this is a problem that cannot wait?

As I understand what your task force was saying, Mr. Augustine, we only have a year or two before our national security is in very real fundamental jeopardy.

What I am trying to do is to isolate where the areas of agreement are, and then we can move on trying to pick off where the areas of disagreement may be

SENSE OF URGENCY.

Admiral **Inman**. Senator Wirth, I believe there ought to be that sense of urgency.

We tend to get a sense of urgency only when there is a war or something like Sputnik. This is clearly an area where we are very close to losing our potential to the major foreign competitors in the whole electronics area, and the semiconductors are the essential element of that. So I believe there ought to be a real sense of urgency in dealing with it.

Senator **Wirth**. The reason I tried focusing on this is the sense of urgency gets reflected up here in the timeframes of when we have a Defense Department authorization bill, when there is an appropriations bill, and we live in various cycles.

If there is a sense of urgency, then it is incumbent upon us to try to think through what the construct is, whether it is the DSB recommendation or some other one, and to try to fit that into an authorization bill, and take it through the appropriations process.

Admiral **Inman**. And all the solutions are not going to be just those from Armed Services. There probably ultimately are going to be some from judiciary, related to some very narrowly defined antitrust issues.

Senator **Wirth**. Our sense of urgency is an annual one—are we going to get it into this year's bill or are we going to wait for the next cycle? That essentially is where the sense of urgency comes.

Dr. Costello, do you have a comment on the urgency issue?

Dr. **Costello**. I brought the sense of urgency with me, so I don't have to say that I now have a sense of urgency.

I know it is there in the technical areas within DOD. The services themselves I think have supported their concerns about the same issues. I believe it is necessary not to wait too long and try to fix everything, but to rapidly approach the semiconductor industry example as a role model, to establish our systematic problem solving capability. I do not think it has to take forever. It can be done, and it has to be done, this year.

Admiral **Inman**. Would you permit a quick add to that?

Senator **Wirth**. Yes.

Admiral **Inman**. I spent too many years in this city, indeed, with a "let's look at this year's problem" approach. I know exactly the pressures you are under.

I think the reorganization of this committee, to focus on issues that run not just on that budget cycle for authorization, is extraordinarily important. I hope you will use this structure and this format of looking at it to try to break out of that "year-at-a-time" cycle.

We are not going to solve this problem on just a 1-year cycle. We must look at where we need to be over 4 or 5 years and then work the pieces of it. The other process simply did not let that occur.

Senator **Wirth**. I could not agree with you more.

But, if there is a sense of urgency, we have to get going now, rather than wait for the next window to open up, which is another year down the line. Isn't that right? That is where I come into the sense of urgency.

I understand the long-term threat, and, having been around this process now for 12 years, I understand that problems come up and disappear, and we have to be very careful not to get carried away with a fad of the time. I think this is fundamental. That was the reason for my first question.

Dr. **Costello**. I have to say "right on," Admiral Inman, too.

There is no quick fix to this problem. We need a studied approach to open up avenues for fixing many problems. But we must get on with this one.

Senator **Wirth**. I see that my time has expired. But, Doctor Gansler, on the urgency problem, Mr. Augustine has reflected his sense of urgency about this, so maybe I can skip to you.

Dr. **Gansler**. I think the reason there is urgency is because it takes us so long to do anything. [General laughter.]

Basically, if you do not begin to act now, it certainly is going to take you another year to do something, and then, after you have done something, the problem is not fixed. In other words, all you have done is to put out some money, and then we have to figure out how to go about doing something, and then actually getting it implemented. We are really talking here about many years to see the results of what you decide to do now.

So you are not going to see tomorrow afternoon, even if you decided today to take action, that we have caught up or that we are now into the next generation of technology or that we have started manufacturing in the United States, and so forth. You are talking about a very long lead-time, years at the very least here.

So, if you don't start, you will never get there. I tend to agree that putting it off does not make sense.

Now, that does not say that you want to use this as an example of what you should always do. I personally think that most of the problems of the industrial base are all special cases, that it is not the same to build ships and to build semiconductors, and the solutions for the shipbuilding industry may be very different than the solutions for the semiconductor industry. As Bob Costello, I think, just implied, what you need is a structure for addressing the problems and an ability to take action from those, as contrasted to another report and another study.

As I indicated in my testimony, the action comes in the budget. It does not come in your speeches.

So, if you are going to take action, it is going to be through the budget cycle. Whether it is the right or the wrong one, you are not talking about breaking the bank with $50 million or whatever.

It is a thrust in the right direction, whatever you put up for this year.

Senator BINGAMAN. Senator Nunn.

Chairman NUNN. Thank you, Mr. Chairman.

I may have missed it since I have been in and out, but what is "it?" What would you have us do? If you could write the defense bill, to the extent that we have any powers and money, if you were to give us language, what would you write in? What would you call it, each of you?

Dr. GANSLER. I would certainly try to introduce, in one way or another, probably some form of "hedged" funding, if I could use that expression; because for manufacturing technology and process investments, particularly in the next generation systems, the reason I would want to hedge the funds is simply to avoid the issue of the military having to trade between more bullets and manufacturing equipment. I would rather say that we are going to spend some share of our dollars, whether it is $300 million a year, or whatever number——

Chairman NUNN. You would do this through the Defense Department?

Dr. GANSLER. I would do this through the Defense Department primarily because wo do not have any other way of doing it. Right now, the United States does not have a MITI. Commerce has never had any success in making such investments. It was even tried in the Carter administration, and they could not get it through. They have not tried it more recently in any place other than defense.

Defense does have a permeating effect in the overall manufacturing sector. One of every 10 manufacturing people are supported by defense, and one in every three or four scientists and engineers.

So, making an investment of this sort, particularly on the manufacturing side, has proven historically and I think would prove in the future, to have a very significant effect on the economy, not just on defense.

Chairman NUNN. Mr. Augustine, what would you have us do?

Mr. AUGUSTINE. Senator Nunn, with regard to that question, I focused my remarks on the semiconductor industry, which is the one I studied at some length, so let me stay with that.

If the industry itself does, in fact, form or capitalize with its own resources a manufacturing institute, I would have the Defense Department award a contract to that institute on the magnitude of about $200 million a year. I would view that not as a subsidy to the institute or the industry, but, rather, as the DOD procuring the technology and a limited number of chips that it needs to do its job in providing for the national defense.

Chairman NUNN. Admiral Inman.

Admiral INMAN. I have not had a chance to study that actual proposal enough to say that I want to buy on to a $200 million figure.

But I do believe that it is important to encourage this consortium approach that is being taken in focusing on the manufacturing aspect, and, therefore, some Government funding ought to flow into it.

How you do that, whether it is as one of the part owners, how you deal with the issues of ownership of the technology and its broad use, how you permit proprietary manufacturing on it, those are all issues that will have to be resolved ultimately.

I believe that clearly is a road, that that investment ought to get into this year's cycle.

Dr. **Costello**. We have mechanisms in the Department of Defense to engage in that kind of program, but it has to be multi-year, one in which the funds are not only authorized but appropriated for multi-years. This is because significant fluctuation or uncertainty would give instability to the organization.

You touched on a very critical issue, the technical data rights. We have to make sure that they can be broadly utilized, so that we build that base from which we can go to the next system.

Admiral **Inman**. After 4 years of running a consortium, let me say that there are many problems once you get started, in controling and also in the timing. Probably the most important point that has been made in this whole approach is multi-year, the need for clear, sustained, long term funding. This is what draws the talent.

Ultimately, this will be something that will make a difference if you draw absolute, first-rate talent. It is the multi-year funding that is the best lever you have in ensuring that that occurs.

CUTTING DOWN R&D CYCLE

Chairman **Nunn**. What about this problem of cutting down the cycle for R&D in order to get a weapon out in the field? You talked about that earlier.

Does anyone have any suggestions about how we do that?

Dr. **Gansler**. I think multi-year budgeting would help you a good deal there, frankly—multi-year budgeting on the part of the Congress as well as on the part of the DOD. Also, some of the other suggestions which were made about manufacturing technology I believe could specifically address that—the decision process, the steps that were taken, even in your "enterprise" programs, where you commit to a program from the time of initiation.

The principal problem that we have had in most defense programs in recent years has not been that we do not plan good schedules, but that we did not keep the good schedules.

Chairman **Nunn**. Of course, it is a political decision. We have to decide it. But what we have now is a proliferation of weapon systems and nowhere near enough funds to fund them adequately, and we are slowing down all of them instead of canceling some and restraining new starts. GAO laid it all out, and everybody knows it. But we cannot seem to come to grips with it.

We may be tackling that one this year.

Do all of you agree that that is the major problem, or do you disagree?

Dr. **Gansler**. I certainly do. It has been demonstrated in studies over and over. I find it shocking. One member of the congressional staff talked to me the other day and said he was so surprised to find how much fat there was in the program because you can reduce them each year and not lose any of them.

What he totally missed was the fact that what he did was to push all the dollars out into the out-years. That is the basic problem that we are facing, and it comes up in every single weapon system. On the F-15, we stretched it out 3 years, raised the cost by $2 billion and lost 84 airplanes. You can give a hundred examples.

Chairman NUNN. What would you think of restraining new starts in order to put that money in existing production lines, and also finding some forcing mechanism to make the Department of Defense close off inefficient production?

Mr. AUGUSTINE. Senator, I was going to comment in regard to your initial question. I think we need to do two things.

One is to make it very hard to start new programs, to be sure that we have strong support for them. The, once they are started, make it extremely difficult to change them. In other words, fund the entire program, at least through a major milestone, for several years, and to not keep pulling up the flowers to see if the roots are healthy. Make it hard to start, and then continue to fund them and do not change the schedules, do not change the goals, do not change the people. Let people go and do them.

Chairman NUNN. Does anyone else want to comment?

Dr. COSTELLO. I believe the restructuring that was done for the Under Secretary for Defense Acquisition is a long step toward that. Mr. Godwin looks at that as a major issue for this new structure, because the limited resources are a very real consideration at ths point.

The new structure is set up so that we can look at it effectively with the prioritization that both Jacques and Norm have mentioned.

Admiral INMAN. Senator Nunn, we have, over the past, done some procurement programs well. We have done them fast and have had good results.

A great many of those turned out to have been so-called "black" programs. The sense of urgency was there, and we managed to avoid the enormous bureaucracy and all of its cost and time in the process.

I would suggest to you, sir, that obviously you have to carefully construct it and ensure people that you are not going to lose security along the way. But, having a special group take a look at three of four of those fairly significant black programs over the years and then compare them to several that are done in other ways, you will begin to see where some of the major impediments are toward getting that kind of speed against cost problems that you see in front of you.

Chairman NUNN. I agree with you. The problem is the word has spread. Now everything is going black. [General laughter.]

Some of it legitimately so, and some of it is just to avoid the red tape.

Admiral INMAN. We had to put a dollar limit on before I left to try to limit that migration simply because it was so much easier to manage the acquisition.

Chairman **Nunn**. Now we have people attacking the black programs, and we could get to the point where they cannot be managed.

I would like to see us take perhaps three or four programs that seem to make sense and do some pilot projects. We could waive virtually everything relating to procurement except, perhaps, equal opportunity and some of the assentials that relate to our value system in this country, but do not relate to procurement regulations. Let the Department of Defense manage those programs in this way for about 3 or 4 years and see what happens.

I am willing to try to take the lead in doing that if I can get some good examples and some help. But I have not received them yet.

Dr. **Costello**. If I may respond, Senator, I have had an opportunity to talk to three different companies in industry about that specifically.

I said, look, why don't you come back to us and show us how you can streamline, how you can take out all of the super-supervision that we offer, the checking that we do. I am waiting for them to come back, because I already have talked to the Inspector General, the Defense Contract Audit Agency, and our Comptroller, to say let's do some preventive maintenance, set this program up and set them aside so that we can do just that, to see how rapidly we can do it and what the impact is on cost.

Chairman **Nunn**. Well, if you come back to us with two or three of those programs do not pick out the most controversial ones in the budget——

Dr. **Costello**. No. I am not going to.

Chairman **Nunn** [continuing]. Because if you do that, we will not learn anything.

I know that the first thing somebody is going to say is let's do SDI that way. [General laughter.]

Dr. **Costello**. In fact, that was a note that was just passed to me. [General laughter.]

Chairman **Nunn**. You have to find something where there is a general consensus in terms of the worth of it, and then you can think about getting that kind of pilot program approved.

Mr. Chairman, my time has expired.

But I want to thank all of the witnesses for being here. We invite you to continue to give us your input.

Senator **Bingaman**. Let me ask a few more questions. We will go through another round as long as we have questions and as long as you are able to stay a little longer.

DEVELOPING A COHERENT DEFENSE INDUSTRY STRATEGY

Dr. Gansler, you have written an article recently that I read, where you argue basically that we need to work on the idea of developing a coherent defense industry strategy as a demonstration for whether it could be done more broadly in our economy. We do spend a lot of time these days arguing about whether there ought to be a general industrial strategy of some kind in this country.

I would be interested in any of the other witnesses' views as to whether it is appropriate for us to pursue something that could be defined as a coherent defense industrial strategy. Or is there too much slippage in that phrase?

I gather from some of the things that you said, Dr. Costello, that you feel that we need to move much more in the direction of having a coherent approach to the questions that relate to the defense industry than we have. I don't know how far in that direction you feel we ought to move.

Dr. COSTELLO. My concern is that if you solve everything as a tactical issue one at a time, you soon box yourself into a corner. I would like to make sure the corner has a door in it so that I would be able to get out of the corner if that is where I ended up.

So, yes, you need to put together a coherent strategy to meet our needs, and one of those needs happens to be a strong industrial base. We cannot have a strong industrial base only suited to the defense needs of our country.

I think Admiral Inman supported that in his initial statements. We have to lay out that coherent program, long-range.

Admiral INMAN. And I really do believe, Senator, that it is found in focusing on the issue of time versus cost versus quality; that a procurement process that looks only to "don't make a mistake" and stretch it out, therefore, as long as you can, but keep a window open for the new technology, this simply will not work any longer, particularly given the pace at which technology changes accelerate. We have to really fundamentally go back and relook at what is the overall value of time saved in that process and, then, where does that also end up broadening the industrial base, not only for use in future weapon systems needs, but also in the ability to compete commercially.

Senator BINGAMAN. I guess you are saying, then, that to the extent we have any kind of coherent strategy with regard to defense industry today, it is out of date and needs to be redone.

Admiral INMAN. It was done for a world of a domestic marketplace, just as the anti-trust laws very validly were put together to deal with rapacious conduct at the domestic marketplace. It never envisioned the international marketplace.

I think the same thing is true here, as you look at a process we have put into place over 25 years.

Senator BINGAMAN. Mr. Augustine.

Mr. AUGUSTINE. Yes, Mr. Chairman. I think that we find ourselves in a very different world from that world that many of our defense industrial policies were tailored to. It is a little like a football team that appears at the stadium and the other side has 15 players on the field. You say that is not football, and the other side says yes, that is right. But they still have 15 players on the field. [General laughter.]

That is the game we are playing today. We are fielding individual U.S. companies to compete with consortia, if you will, of large industrial firms, with banks and an assemblage of industrial partners, with labor support, with academic support, and with enormous government support. We are finding that our individual companies, even the biggest ones, let alone the little ones like those in the semiconductor industry, just cannot compete in that game, with 15 players on the other side of the line.

So, either we have to get them to go back and play the game of football the way we knew it, which I think is not likely, or else we have to tool up to take them on on their own ground.

Senator **Bingaman**. Dr. Gansler, did you have any comment on that?

Dr. **Gansler**. Not really. I just think it is important to recognize that the question in defense is not whether you should be involved with the industry, from the Government's side. It is not a relevant question. The Government is the only buyer of most of this stuff. It is the regulator, the banker, the court of claims, and you can go on. There is no way that you can get disengaged. The question is how to do it smartly, how to create market forces, if you can, in order to achieve the efficiency. And in those areas where you can't, how do you take a structural, broader view, rather than just the detailed regulations that we have been trying to get away with.

Senator **Bingaman**. One of the suggestions—and I think this was inherent in your comments, Admiral Inman—was that whatever new strategy we develop has to have more tolerance for failure. The example that has been cited to me is that the first seven Polaris tests failed. Under today's regime, we would cancel that program.

Admiral **Inman**. I think you put harsh penalties on for malfeasance, and you build in substantial forgiveness for honest mistakes, so long as they were trying to accelerate the stream you were on and let you get the system delivered faster.

Senator **Bingaman**. Let me ask this.

NATIONAL ACADEMY OF SCIENCE

We had testimony last Monday by Dr. Frank Press, and he made a point where he said the National Academy of Science did a study of defense industries which concluded that defense industries have invested in new equipment and advance process technology at only one-half the rate of the non-defense sector. He said that our defense plants are filled with out-of-date equipment.

I would be interested in whether anybody wanted to agree, to disagree, or to elaborate on that comment?

Admiral **Inman**. Senator Bingaman, there are no incentives at this point in time for them to make that investment.

I got into this problem about 2 years ago in tracking the Air Force's ICAM effort. I can't remember the acronym, but it was their focused effort out of Wright-Patterson on manufacturing, and a specific instance where they had offered up about $42 million to a major contractor to automate the production line of a very major procurement.

The money was pushed right back across the table, because the current contracts were so iron-clad and their process was so certain that they were sure of the profits they were going to have for 10 years. But if they had moved into automating that manufacturing facility, they ran substantial risks that in the transition they would no longer deliver exactly on time and, therefore, the short-term profit could be severely impacted.

Now, they could have ended up at the end of that time with a modern manufacturing facility that could have made them competitive in any kind of market sector. But there were no incentives for them to do that in the current procurement process.

Senator **Bingaman**. Mr. Augustine.

Mr. **Augustine**. If I might comment on that, it comes back to the question of stability of programs and turbulence of programs. The sort of case Admiral Inman describes of a manager in industry who looks at a program and has no assurance that the program will be funded beyond the current year, well he is very reluctant to make huge investments in plant and equipment. If you knew for certain that the program would continue for 5 years or through its completion, you would be inclined to make those great investments.

The problem is exacerbated by the extreme focus that is being placed today on low price, in terms of selecting winners in fixed price competitions.

So, when you have a government which is, essentially, the only customer for this industry and can unilaterally at any time terminate a program, there is a great reluctance on the part of industry to invest in the sort of thing you are suggesting.

Senator **Bingaman**. Thank you.

Dr. Costello.

Dr. **Costello**. I believe that we have made a first step, and we will say that it will be reflected years down the road with a change in profit policy to emphasize investment. But Admiral Inman was very astute in pointing out incentives.

It is not only incentives for the contractor; it is also incentives within the structure of our activities to make sure that our people want to make these changes in cost reduction, and are themselves changing. We do not have very many incentives anyplace in our system that reward change. We hope that we will be able to restructure some of those in a period of time, and incentives are key.

FS–X ACQUISITION

Senator **Bingaman**. Let me ask one other question on this offset issue, and either Dr. Costello or any of the rest of you may respond. One other problem case that has been in the news recently is this Japanese FS–X acquisition issue, where evidently there was a determination to go with their own production.

What I am interested in is this. Senator Danforth has spoken out very strongly, expressing his concern about the fact that the Japanese are evidently going forward with their own production because they see major economic spinoffs, rather than pursuing some kind of joint production with any of our aerospace companies.

I wonder if any of you have some comments on that, as to whether that is an example of the kind of protectionist problem that requires a response by the Department of Defense.

Dr. **Costello**. If we can answer, we will have to answer for the record because we are not sure of what the program is and how far the Japanese have gone.

Senator **Bingaman**. Okay.

[The information referred to follows:]

Fighter Support Aircraft (FS-X)

The Japanese have not made a decision on their future Fighter Support Aircraft (FS-X). They plan to make a decision later this year. We have, and continue, to consult with them on this selection. We are examining with them the benefits of production of the F-16 or F-18, or a derivative of these modern aircraft which we could undertake together. We believe the Japanese decision will reflect the positive and long-standing strength of our security relationship and benefit both nations. I trust the forthright manner in which we are handling this subject, in close cooperative with the U.S. industries involved, is indicative of the fact protectionist legislation would hinder rather than further the security and economic interests of our Nation.

Senator BINGAMAN. Does anybody else have a comment?

Dr. GANSLER. I would like to comment a little bit. When Nakasone was the Minister of Defense, prior to becoming the Prime Minister, he stated what their defense industrial strategy was going to be. He made it explicit, and to me it made sense. If I were their country, I would do the same thing. It is not very far from what I just recommended, in fact.

He had five points.

One was to maintain Japan's industrial base as a key factor in their national security, which, as I said, I think we ought to be doing.

Second was to acquire equipment from Japan's domestic R&D and production effort. So, it should not surprise us that their defense production would be done domestically.

Third was to use their civil industries, which is exactly what we have been talking about to integrate civil and military. To me, it makes sense to do that. And yet, we almost build barriers against doing it, with things like our cost accounting standards and a lot of other barriers.

Fourth was to have R&D and production plans follow long-term perspectives, rather than short-term. Again, this is exactly what we have been talking about in terms of manufacturing technology investment and long-term R&7D at the component level.

Fifth was to introduce the principle of competition into defense production. This is exactly what Admiral Inman was saying. We need some form of incentive to get people to invest. Dual sourcing is an example of one that the Japanese will probably go to in order to create incentives.

Traditionally, in their strategy, they had competition as a major part of it, internal domestic competition, to drive down costs and drive up quality.

So when we take a step like that and they state, really a number of years ago, what they are going to do, and then they go and do it, we should not be very surprised. I think it is a sensible strategy for us to take. It is a long-term strategy. It does not build trade barriers. It takes a long-term investment strategy.

Senator BINGAMAN. I think that Senator Danforth's criticism is that in this case, he sees about a $6 billion cost to the Japanese for going the way they are intending to go, and obviously sees some major downside for us in the process.

Senator Wirth.

Senator WIRTH. Thank you, Mr. Chairman.

SENSE OF URGENCY

Let me go back, if I might, to the line of questioning that I was pursuing and pick up on the question that I asked about a sense of urgency. You all said yes to that question. Dr. Gansler said yes. If for no other reason than it takes so long to do something. At this point, Chairman Nunn asked "what is it," what is it that we ought to be doing.

In response to that, Dr. Gansler said, as I remember it, that we want to make an investment in our manufacturing base and in process technology of about $300 million a year. Mr. Augustine says if the industry forms an institute, we ought to have a DOD contract with it of about $200 million a year. Admiral Inman said he had not studied it enough really at this point to know, but if $200 million was right, then probably a consortium was the way to go. Dr. Costello said that we ought to do this on a multi-year basis, but that the Defense Department really had not decided what its reaction was to the specifics of the DSB report.

I hope that is an accurate summary of what "it" is. But we still have not defined what "it" is, I don't think. I am having trouble.

We get into a situation of saying let's put $300 million or $200 million in, maybe that is the right amount, and form a consortium. Should we just say to Secretary Weinberger, to Dr. Costello, okay, here is $200 million a year, now you guys go ahead and do with it as you see fit? Or, in the process of doing that, should we write authorizing language and attempt to sort through a number of the other issues that come up?

As I was listening today, let me make a list of what I think some of those issues are.

In allocating funds, should we make a distinction between DRAMS and customs chips? That is an issue that has come up. You all know the arguments better than I do.

Should we develop a high volume production facility or do prototype production?

Should we put an emphasis on a consortium or farm it out to centers of excellence or the universities?

Should we focus on reviving the independent merchant producers or to the growing captive custom chip makers?

In other words, if we are going to give you $200 million, should we try to define how that $200 million will be spent? Is that going to help you to do your job? Or should you receive that $200 million and then face this whole set of questions a little bit further down the line?

How far do we want to get into micromanaging the semiconductor problem?

Norm, maybe I should start with you.

Mr. AUGUSTINE. Fine, Senator Wirth. I would like to do that.

I think that perhaps the role Congress could be most helpful in would be to let the industry now try to put together a consortium of some type, and let the industry go and do that, and for the industry to capitalize it. I think that may happen.

Then let the industry go to the Defense Department and seek from the DOD the specific type of help that it finds most useful. And then, assuming that passed the test of reasonableness, then to fund that money. In other words, I would kind of do it as pull from the industry rather than as push from either here or the administration.

So I would let the DOD come to you with a proposal, based on what the industry would say to them.

With regard to the specific questions you raise, which are good ones, I have some personal opinions that I will quickly share.

I think that we should continue to place considerable emphasis on mass memory as a technology driver, if nothing else.

I think that we need to worry about the merchant producers as well as the captive producers. I think we cannot disregard the merchant producers, particularly if we are trying to help the defense industry as a whole, because it is the merchant producers, of course, that supply the defense industry.

With respect to volume production versus prototyping, I think there is some semantic difficulty in the current debate that is going on.

One can think of prototyping, which, to me, means building a few of an item. One can think of a single volume production line, where you are proving you can build at very high rate, but only with a single line. And then there is a case where you might have a large number of identical lines producing huge numbers of chips for commercial use.

In my opinion, it is that middle case, the single line of volume production, which some people would call prototyping, but I think it has to be in volume, and the end use has to be for the commercial market to prove that you can sell commercially in that tough world.

Senator WIRTH. Thank you.

Dr. Gansler.

INDUSTRIAL STRATEGY BASED ON POLITICS

Dr. GANSLER. I think one of the worst things we could do in the Nation is to develop an industrial strategy that was based on politics.

If we can avoid politicizing each of these decisions and do them for what might be good for the nation, as contrasted with the suboptimization that would come out of a decision and a vote and a process within the Congress as to what the best action on each individual case would be, if we can move in the direction of depoliticizing it, to a certain extent, I think we would be better off.

The sense of what Congress thinks is important is critical here. But the idea that on each issue that comes up Congress will decide whether it is a prototype line or a production line, that, I think, is going much too far. I would much prefer to see Congress give DOD the guidance as to the general direction—not even for semiconductors, but more in the broad industrial strategy direction—and the types of resources that you think are reasonable over a number of years to spend in this area, for some kind of general thrust that might be given; and then provide the oversight that says yes, that was a sensible thing, or was not a sensible thing, during the normal multi-year, hopefully, budget reviews.

But say to the DOD get your act together because, right now, it is all totally on an ad hoc basis. An issue comes up; it is raised by constituents; it becomes a congressional debate; we decide to set up a trade barrier or pass some new regulation or set up some new factory, totally on an ad hoc basis, and yet the issue is growing more and more frequent and we need some institutional structure for doing it. I hope this is what Bob Costello was talking about trying to address.

I think that then you want to let that organization, whose needs are being satisfied by this structure, respond. Give them some dollars, give them some general guidance, but do not tell them how to do it also.

Senator **WIRTH**. Thank you.

Admiral Inman.

SEMATECH

Admiral **INMAN**. I got in the mail on Friday a press release from the Semiconductor Industry Association of an announcement on the fourth of March on what they would now propose to do with Sematech, which is somewhat different from what I understood earlier: "Establish a facility in which a wide range of U.S. manufacturers and equipment and materiel suppliers will jointly pioneer advanced manufacturing techniques, the results to be shared among the member firms. The techniques will encompass every area of semiconductor manufacturing, including materials, lithographic process and equipment development, defect reduction, statistical quality control, automated manufacturing, computerized data collection."

I am enthused about that, about creating the technology. What I want to see along with it is where is the incentive to use it once it is done.

One of the things that came to mind while sitting here and listening to this conversation is that you build into your procurement process some incentive, some advantage, that if a company takes that new technology and puts the line in place, they will have some benefits, in the profit they are permitted to get, some incentive that you build in that will encourage them to use what comes out of this facility.

So there are two answers: some Government investment for the long-term, to make sure Sematech gets put into place and attacks all these problems, which have the potential of adding to our competitive advantage, as well as better products for DOD; and then, build in the incentives to make sure the technology gets used when it is created.

Senator **WIRTH**. So, add to the $200 million the Inman test of broad commercial applicability.

Dr. Costello, you have heard what everybody wants to give you. What can you say?

Dr. **COSTELLO**. I am happy. [General laughter.]

Senator **WIRTH**. But you only asked for $50 million.

Dr. **COSTELLO**. Well, I think we put the $50 million in because we did not know what the numbers were going to be. We had to say yes, there is a real requirement.

First of all—and I am taking the avenue myself—I am saying to the industry get your act together. What are you going to do? What do you think the real problems are? They should know better than we do, because they are the experts.

Then, once we have consensus, we need to do some multi-year funding. I think we need to look at the state of the art. What are the theoretical physical limitations of using silicon?

This problem should demonstrate our ability to approach the theoretical limits.

Do not overlook other perhaps competing technologies down the road. One of your requirements for this new consortium has to be detailed and in-depth knowledge of other competing technologies.

They have not worked on organic memories for some time, but they may again.

In that way we will keep a balance and perspective. Yes, we need some incentives when we are done, and I think one of the incentives can be we'll go back to specifications.

This is a process spec now, it is not a parts spec. If the Department of Defense can say "all of our parts of this generic type have to be made by this process," we are going to get some things into place and some benefit out of that.

I think that is just an extension of what we already do today.

There are some initiatives we control that we can strongly support through a demonstrated, integrated activity within the industry, with definitive goals, and then place on them the balance of the rest of the technology.

Senator WIRTH. When are we going to get that back from you all?

Dr. COSTELLO. Let me check with Dick Donnelly. Dick is saying the same thing that I am. We need to hear from the industry.

In the last month, they have changed their role.

I happen to be a strong supporter of this approach. When I heard that, I said they made a significant stride forward.

I do not want to discard the fact that we have to have manufacturing as well. After we leave this hearing and the minutes get published, I am sure we will have a lot of anxious people in the semiconductor industry coming to see us. If they do not, I am going to call them anyway.

Senator WIRTH. Well, that is one of the things that we want to do, to move this along. There is a sense of urgency that I think is shared by many people. The faster we can move it and alert the industry and others that we want them to come to you with this proposal, the better off we will be. As Mr. Augustine says, there is nothing sacred about DSB; if somebody has a better construct and better idea, fine, but let's get on with it as time is short, which is what Dr. Gansler was saying.

Dr. COSTELLO. Acquisition has the ball in their hand to get industry to move.

Senator WIRTH. I am hearing that we ought to do something, that there is a sense of urgency about it, that it is going to cost something in the neighborhood of a couple of hundred million dollars a year, probably over a number of years, that we ought to have a prolonged effort on this base, and that we ought to get a general sense of congress written into the Defense authorization bill for you, but that it is up to you to work with the industry to define what is going to happen and to do that quickly.

Is that a fair summary of what I have heard today?

Mr. AUGUSTINE. Senator, you summarized it very well.

Dr. COSTELLO. Very good.

Admiral INMAN. It is a partnership requirement. All of the money is not from Government. They clearly have to put up as well. That is the incentive to use it that they have created.

I would make two quick footnotes, if I can, trying, really, to go back to your earlier question of how do you parse this down into things that you can check on or follow.

On the mil-spec issue, there may still be areas where you need mil-specs to drive the production for what a ship or a tank is going to look like, but certainly not in this area of electronics, and then the process spec. And then, do not constrain it to specific mil-specs. That runs totally counter to automated manufacturing.

The other thing is watch for the equipment manufacturers involved. This is the great vulnerability. They have the least capitalization. When the Japanese got their effort, the Japanese giant companies got together and pulled in their equipment manufacturers, funded their effort, and moved them to state of the art in producing equipment.

Clearly, we need to ensure that U.S. equipment manufacturers are a fundamental part of this effort so that we have them ready to produce as soon as the technology begins to evolve.

Senator WIRTH. Finally, Mr. Chairman, we must not politicize it. We earlier had defined a proposal that would have two facilities—one in Albuquerque and one outside of Denver. But we will not do that now. [General laughter.]

Thank you, Mr. Chairman.

Senator BINGAMAN. Let me ask this.

RESPONSE BY TRADING PARTNERS

Assuming that everyone gets together and goes forward with this initiative—which I hope happens—do you anticipate a reaction or a response by the Japanese, by other trading partners, to gear up their efforts, or are we coming along behind?

Admiral INMAN. On the manufacturing side, they are already moving at a fast pace. We are trailing on this one.

On the creating of technology, we have a better base and in most areas we still have the lead. Part of this effort would be to try to accelerate that.

But, on the other side, they already have their focused efforts on the manufacturing process.

Senator BINGAMAN. Mr. Augustine, would you anticipate a response by our trading partners in this area?

Mr. AUGUSTINE. I think they would say what took you so long? [General laughter.]

In a more serious vein, I think they would realize that we now are going to be a tougher competitor, so they will probably redouble their efforts. But this is a race, and that is the nature of a race.

Senator BINGAMAN. Dr. Gansler, did you have a comment?

Dr. **Gansler**. Yes, I would just make one point about the somewhat facetious remark that Senator Wirth made about maybe two plants. It should not be taken totally facetiously. Also, there is the comment that Bob Costello made about being sure that you are looking at more than one technology.

I mean, somehow or other, when the Japanese structure something like this, they try to maintain some form of market force, even domestically. There is a real danger that we will get ourselves into a situation where we will specify a process and a plant, and it must be bought in that plant in this country, and you have suddenly eliminated the competition in the semiconductor industry.

Granted, we have had discussions here today about competing with the Japanese in the semicondutor industry, but we need also to consider if we take actions that end up in creating a sole source and eliminating the incentives that Admiral Inman was talking about, we could just as easily hurt ourselves.

So we need to continue to think about the strategy: where are we trying to head in 10 years with this step, rather than can we just set up a plant immediately.

Dr. **Costello**. I would like to make a clarification.

My intent was not to go to a sole source but to make it attractive for these process technologies to be applied broadly.

I have been in Japan a number of times over the last 15 years, and they have been constantly afraid that this sleeping tiger will awaken. It is about time that we did.

Senator **Bingaman**. All right. That is a very good comment.

Is there further comment?

Senator **Wirth**. Yes, Mr. Chairman. While we have this distinguished panel with us, let me use a different approach, which really goes to some of the things you were talking about, Dr. Gansler.

HEALTH PROBLEMS OF THE INDUSTRY

We come up with a problem like this, and this is really a double problem.

One, we have a problem: what do we do in semiconductors or machine tools or ceramics or a variety of other industries. What mechanism should we have for dealing with that?

Second, I have served on this committee for only 2 months, but I hear a great deal about and find myself very sympathetic to issues of concern about the health of the defense industry, which you all have touched upon today. So my second question is what kind of mechanism should we set up or should Mr. Weinberger set up to assess and address the defense industrial base. Should it be a Defense Science Board panel for looking at the kinds of issues that relate to the health of the industry?

You mentioned five issues, as I remember, Dr. Gansler.

So my question is really twofold. One, should we set up some kind of new mechanism that looks at areas of industrial strategy or industries that we should be concerned about? Should there be some kind of mechanism to do that? Should we be, as this new subcommittee, setting up some kind of mechanism to look at the health of the industry?

Mr. AUGUSTINE. I would be happy to start out with that, Senator Wirth.

I think the defense industry, of which, of course, my company is a part, is in a somewhat different circumstances than the semiconductor industry which we talked about.

Senator WIRTH. Yes, I understand that.

Mr. AUGUSTINE. Our industry has the good fortune that the only place the U.S. Government can really buy weapons in large quantities is from our industry. So we do not face a competitive problem.

The problem we face is are we going to be a strong industry able to serve our one and only customer in the years ahead. I am speaking now as an individual and not as a representative of the Defense Science Board.

I think that, if we continue some of our current acquisition policies, then 3 or 4 years downstream we are going to find a number of the companies in our industry in severe financial difficulty, the kind of difficulty we saw after total package procurement in the late 1960s, where a number of companies were in danger of going under.

I think that is the nature of the problem for the defense industry. It is a totally different kind of problem, but a terribly important one, as your question suggested.

Senator WIRTH. I recognize that there are two totally separate kinds of issues. One is when we have these kinds of future industrial problems. Then should we set up some kind of new mechanism for dealing with those industries and addressing the problems like in semiconductors?

Another issue is should there be some kind of mechanism that goes to the questions of the health of the industry.

Mr. AUGUSTINE. When I attend industry meetings and listen to the views expressed in private in those meetings, and I listen to the views expressed when I serve on panels in the Government, they are two totally different worlds.

I think there is a much greater concern on the part of industry than one would derive from listening to the Government today.

I think it would be very appropriate to take a look, to try to understand what we are doing to our defense industry.

Senator WIRTH. But how do we do that? Maybe you are not the best one to ask and it may not be fair to ask you.

Mr. AUGUSTINE. No, I am not the best one.

Senator WIRTH. Admiral Inman, what about you? I see you watching the clock and am sorry to be keeping you for so long. But this is such a distinguished panel, that I want to take advantage of your expertise.

Admiral INMAN. I'm sorry, but there is another hearing I have to go to.

I think it would be worth an effort—dealing with one of your questions—of trying to assess where are the other areas beyond semiconductors, where our lead is either already narrowing or may well be threatened. Where do we see new developments coming abroad? What do we have comparable to it?

I do not know what the U.S. intelligence community is capable of providing you at this point in time. It is a flat fact that about 1980 or 1981 the answer would have been almost nothing. Because of the long years of draw-down, there simply was no on-going effort looking at any of the economic activities of our political and military allies who are our economic competitors.

So I do not know whether they are now far enough along and watching it that they can give you some advice. Maybe there are some non-governmental activities that watch these which can help.

I think an effort to try to say that we are already at the thin edge on semiconductors, and are well past it in machine tools, so where are the others sectors that have an impact that we ought to being looking at now before they become a crisis—this would help.

On the health of the industry, from these 4½ years of wandering the country and talking to a lot of people, it is very different from the days when I used to be managing procurement for the Government's side.

I think you will get some different views about the general overall health of the industry, depending on the level at which you talk in the defense industry. If you are talking to people who have done things in one way for a great many years and have done well for their shareholders because of profitability, you will get one view. If you get down into companies of people just swamped with the morass of doing business with the Government, who deal with the day-by-day frustrations of it, you will get a different view.

I think the view from the lower level will tell you that we are in a lot more trouble than the one from the upper reaches.

Dr. **Costello**. We have already established an initiative that says we must look at the industrial base, and we are putting together a way to identify those industries, or, better yet, those technologies that are not being applied yet. How do we do it with a clean sheet of paper? That is even more important. How do we identify those upcoming technologies and what do we do to structure the resources here to meet our needs that can be developed once we have the capability?

I think it behooves we in the Office of Production and Logistics to be able to put together a test for industry, for our needs in the industry. We are doing this with DARPA, and the Advanced Technology secretariat as well.

We are taking the lead. We think that has to be an important role to play.

Then, if we look at the activities with industry, one of the other initiatives deals with our relations with industry, all the laws that we deal with to see what we can do to do some streamlining. One of the activities we have right now is to say what laws do we need if we have an emergency.

I say get that list in a hurry, because maybe those are only the laws that we need right now. [General laughter.]

Admiral **Inman**. While you are trying to build in those incentives, see if you can build in some to attract some very bright students to go for manufacturing engineering degrees instead of MBAs and law degrees.

Mr. **Augustine**. Right on.

Dr. **Costello**. We think that we may have to change the DARPA charter or have a parallel activity to DARPA to say there is a manufacturing base here that we may not have focused on as well as we should have.

This is in concert with what you are saying.

Dr. **Gansler**. Senator Wirth, if I could comment just for the sake, perhaps, of controversy, I disagree that you can separate out the short-term Government-industry linkage question from the long-term investment strategy question.

I think that we are going through a period right now where we have really made some very negative steps relative to the defense industry. I am seeing it in the professional services, in terms of the profit policy. It is just unacceptable as far as I am concerned. The industry will disappear, in terms of the R&D and ideas industry, with the steps we are taking today.

I think that to separate out the initiatives, so-called, that are being taken on how we do business with the question of maintaining a long-term, viable, healthy industry, is wrong. We need to address simultaneously both those questions.

How we go about making our long-term investment strategies are clearly the kind of issues you should be involved with in this committee. I think one of the answers to your question as to how to go about addressing this, I think the existence of this subcommittee is a major leap forward, a recognition that this is something that we should be addressing at the top levels of our Government. The fact that Bob Costello is saying that that is one of his major initiatives, and he said it carefully, he said there are two major initiatives: one is the long-term manufacturing and the other is the business/Government relationships.

I think those would have to go hand in hand, and I would hope the committee would address itself to not on one hand allowing other parts of the Congress to destroy the industry while you are starting over here, trying to build the long-term viability of the industry.

They really are simultaneous actions.

Senator **Wirth**. Mr. Chairman, thank you very much. I hope I have not taken too much time on that. But I think we are getting down to the direction in which you believe we ought to be going and it all begins to take some sort of form for us for the kind of longer-term issues that we are looking at.

I thank you all for being here.

Thank you, Mr. Chairman.

Senator **Bingaman**. I want to thank you also. I think the testimony was excellent. I hope we can do some constructive things this year as a result of it.

Thank you very much.

[Questions for the hearing record with answers supplied follow:]

Questions Submitted by Senator Carl Levin

KEY CONCLUSIONS IN AFFORDABLE ACQUISITION APPROACH STUDY

Senator **Levin**. Dr. Gansler, 4 years back you were the project leader on a comprehensive study done for the Air Force called the "Affordable Acquisition Approach Study". Quoting from the Study: "The Affordable Acquisition Approach Study was undertaken in response to the growing concern over increasing program costs . . . and a trend of lengthening development and production time cycles for major programs."

I would like to ask you some questions regarding that study and what has transpired during the intervening 4 years.

Let me quote one of the key conclusions of the study: "Production rates for major weapon systems have been decreasing steadily over the past 30 years. Such decreasing rates raise the issue of production inefficiency and result in slower deployment."

Based on what you have seen during the past four years, would you say this trend is continuing?

In this year's budget, 20 of the 33 high tech munition lines were stretched out. 11 of the 25 aircraft production lines were stretched out. 3 out of 4 of the combat vehicle production lines were stretched. Does this suggest that we haven't taken to heart the lessons contained in the Affordable Acquisition Approach Study?

Dr. **Gansler**. The data over the last four years would indicate that we have continued to stretch out programs as cost growths and/or reduced budgets have dictated. Even in cases where the DOD was willing to terminate a program, the Congress refused to do so—so the problem occurs on both sides of the river. On the positive side, I would observe that cost growth has been reduced (partly through the results of more realistic cost estimating as well as through new acquisition techniques, such as baselining). I would also have to say that there has been a growing awareness of the importance of program efficiency and of minimizing program stretchouts. Thus, if defense budgets were to continue to rise, I think we would be in a relatively good position to control the stretchout problem. However, the coming years would appear to be an extremely difficult one for both the executive and legislative branches with regard to defense acquisition decisions. There will be extreme pressure for increased quantities of conventional systems (to counter Soviet quantity and quality, as well as to adjust to strategic arms control agreements) and there will be growing pressure on the defense budget due to the programs that have already been initiated during the prior build-up but are now not yet fully paid for, e.g., the shipbuilding program. Additionally, there is the need to replace the older systems that are becoming obsolete in the field and there's a whole new generation of systems just beginning to enter the drawing boards, e.g., "ceramic" tanks, stealth aircraft and SDI space weaponry.

The only way we will be able to afford a significant amount of this equipment is with a combination of increased budgets and a greatly improved acquisition process—and particularly in the long-term resource and program planning area; with extreme discipline required on the part of both the executive and legislative branches.

FUNDING INSTABILITY

Senator **Levin**. Dr. Gansler, your study looked at the causes of slower production and higher costs and concluded that funding instability was a major factor.

Given what we have seen during the past 4 years, would you say that funding instability remains a major problem in the acquisition process?

What do you think are the underlying causes of funding instability?

Dr. **Gansler**. My perception is that funding instability continues to be a major problem and, if anything, is likely to get worse in the coming budget era—unless improved discipline is applied. The problem begins with the Congress, wherein the defense budget is reviewed basically as a 1-year issue. The United States is the only nation in the world with a 1-year defense budget and it is impossible to efficiently run an acquisition program under such conditions. Many responsible studies have recommended going to a multiyear defense budget and the executive branch has strongly supported it. Thus, it is only congressional politics that seems to be limiting the ability of the U.S. Government to make a major step forward in improving its efficiency and effectiveness. It must be recognized that the presence of a multiyear budget does not prohibit the Congress from revising it periodically, should international or national conditions require it. It does, however, introduce a considerable element of stability and responsibility into the system—which is sorely needed. This year the Department of Defense submitted to 2-year budget to the Congress (as recommended strongly by the Packard Commssion). The nation is waiting to see whether Congress will act responsibly and address it as a 2-year budget, for which they are willing to commit to at least the second year. (Recall that Congress recognized the importance of this longer range perspective when they passed the budget law requiring them to set 3-year targets. However, unfortunately, Congress has not viewed these as binding in any way—even to begin the process for a subsequent year.)

As to the continuous shuffling of line items and relative program priorities and quantities that goes on in the annual mating dance between the Congress and the executive branch, I personally think it is extremely difficult to place blame on either side. I believe they are both fully to blame, and that the only way the system will be corrected is for them both to begin to introduce discipline. The Defense Department has taken an initiative in trying to "baseline" and of their major programs—which represent the major share of the dollars and thus of the efficient use of resources. And the Congress has responded with a small initiative in the area of creating "enterprise programs" (for a few, major DOD programs). These are both very positive steps in the right direction; and, when combined with multi-year budgeting and programming, will certainly begin to introduce stability into the process. Nonetheless, I believe it is up to Congress to "set the tone" in this area. The reason that multiyear planning works so far more effectively in all of our allies' countries is because it is assumed that these multiyear program and resource plans will, in fact, be lived to—over the 5-year period for which they are applicable (with an annual updating, in many cases, for the 6th year).

Introducing such stability into the process will then force the system to do more realistic estimating—both for the "top line" of the defense budgets in the outyears as well as for the individual weapon systems. In the latter category, this would mean associating "risk dollars" to programs so that they could live within their planned resources. Such realistic costing would obviously result in fewer programs being in the budget, but those that were in would be far more efficiently run and we would end up getting much more military capability for the dollars spent.

GAO TESTIMONY

Senator LEVIN. Dr. Gansler, last month the Comptroller General testified before our committee. Let me read from a portion of his testimony.

"Historically, too many weapon systems have been started or proposed for the limited funding available, and often the cost estimates for the systems have been overly optimistic. This combination—too many programs and optimistic cost-estimating—has produced the much discussed "bow wave" phenomena where future funding requirements out-strip funding availability.

Is this the underlying cause of the funding instability problem you identified in the Affordable Acquisition Approach study?

Is this why we have had such stretchouts in recent years?

When you look at the large number of major new starts in the budget, do you think that we are repeating history by starting too many weapon systems for the limited funding that is available for them?

Dr. GANSLER. I think the Controller General's testimony includes some of the causes of budget instability, i.e., too many programs with overly optimistic cost estimates, however, I think he has neglected the first and most important cause; namely, the fact that there is not early agreement between the executive and legislative branches on what the top line dollars will be over an extended time period, e.g., 3 to 5 years out. The result of this is that there is an extreme "optimism" applied to the total defense dollars likely to be available and thus it is believed, by the executive branch when they put all the programs into the budget, that they will, in fact, be able to pay for them (if the dollars on each program don't rise, of course).

Thus, it is the *combination* of the lack of realistic long-term top line defense budgets, in addition to the optimism on each individual weapon systems cost, that results in the need to either cancel programs or stretch them out (and, or course, we always pick the stretchout approach).

The solution to this problem is—as I've noted on a previous question—the disciplining of the Congress and the executive branch to agree on a 5-year resource plan (with the debates that get held annually in the budget cycle primarily addressing the 6th year not the first year). While such a multiyear activity may not be required in many of the overall U.S. Government budget categories, it is clearly require for weapon systems that take 4 to 8 years simply to develop and then another 5 to 10 years to produce. Such long-term programs will only be disciplined when "affordability" can be honestly addressed by knowing how many dollars are going to be available in the outyears. Again, it is up to *Congress* to provide this necessary discipline if the system is to be corrected.

KEY CONCLUSION ON STRETCHOUTS IN AAA STUDY

Senator LEVIN. Dr. Gansler, the Affordable Acqusition Approach study specifically looked at the problem of production stretchouts. Let me quote from the study.

"The combined effects of funding constraints and program cost growth historically have forced significant reductions in annual production rates and stretchouts in procurement plans. These rate reductions have, in turn, contributed to higher unit costs and further stretchouts."

Hasn't this situation worsened in the past 4 years since you conducted that study?

What did your study suggest as a way to break out of this problem?

Dr. **Gansler**. I believe I have previously answered this question from a slightly different perspective in the earlier questions. Essentially, I stated that there have been some actions taken in both the executive and legislative branches; but that until Congress seriously steps up the question, and takes the lead on longer term resource planning, it is likely that the problem will continue—even if the DOD does everything it can within its control. Nonetheless, I certainly will continue to personally push the DOD to take these highly desirable steps at gaining cost realism and improve long-term program and resource planning. I would just hope that the Congress could discipline itself as well; thus further encouraging the DOD in these initiatives.

COST OF STRETCHOUTS

Senator **Levin**. Dr. Gansler, your study looked at the potential cost of stretchouts. The study postulated that there could be as much as a 30 percent reduction of production for the fiscal year 1983–88 program, and that the stretchouts would drive up the total cost of the program between $6 and $14 billion dollars. The midpoint of your range estimate was $10 billion. This was for Air Force programs only.

The Congressional Budget Office has looked back over that period and has calculated that DOD got only 83% of the procurement plans laid out in the fiscal year 1983 plan. Approximately 75% of the reduction occured within the Pentagon before DOD submitted the budget, and the remaining 25% was imposed by Congress. This seems a little better than your forecast, but it suggests your forecast was fairly accurate.

If the Air Force program costs have increased by $10 billion because of stretchouts, this suggests that procurement costs for all of DOD have probably increased $20–30 billion because of the stretchouts. Does that sound plausible to you?

Dr. **Gansler**: It does not surprise me that the analysis of the past 4 years indicates that the projections about program stretchouts were probably correct—since that analysis was based on prior history and we have not taken all the necessary steps to change the process—particularly, as noted above, the introduction of long-term resource planning within the Congress. I also think you must realize that over the past few years we have operated within a rising defense budget and a falling inflation period; reversals in either of these could have exaggerated the problem over that time period and may well do so in the future.

I do have a problem with the analysis as to where the reductions that occurred in program quantity actually initiated. As I noted in answer to a prior question, I feel that the problem is basically an iterative one and lies in the relationship between the Congress and the executive branch; not, in fact, on either side exclusively. For example, if the DOD thinks the Congress is going to lower the budget next year from what it had previously believed it would be getting for that year, then the DOD will revise its numbers downward. By the scorecard it will look as though the DOD made a revision. However, this revision was necessitated by a top line change that came from the Congress. Similarly, when, during hearings on the budget in one given year, a member of Congress believes that he has found "fat" in a defense program and can cut it significantly without reducing the quantities, what he has most likely done is to force a stretchout of the program and either a significant increase in the cost of the program or in fact a significant reduction in the quantities in the outyears. Naturally, when a member of the DOD underestimates the cost of a weapon system or overestimates the likely dollars that will be available for his weapon system, he has committed a similar error and has undoubtedly forced the program to have a stretchout in the outyears.

If I look at the total of $150 billion of acquisition costs that we spend annually, it certainly would not surprise me if there were a potential for getting increased effectiveness, i.e., more equipment for the same money, at a level of perhaps $15 to $20 billion a year through greatly improved discipline in the acquisition process—in both the Congress and the Pentagon. However, I must emphasize that this improvement can only come about through efforts on both sides, and we should not expect to receive "instant benefits." What we are talking about is improving the efficiency of a long-term process and the savings will not be seen until a few years hence.

AFFORDABILITY OF ALL NEW STARTS

Senator **Levin**. During the past 5 years the services have launched plans for a large number of new programs with the expectation the budget would grow forever. Now the budget is flat, and could well decline.

Some of these new starts are extremely expensive:

	Billions
LHX helicopter	$60
ATF fighter	50
ATA bomber	40–50
C–17	35
SSN–21	35
Midgetman	50
V–22	40
Total	310–320

Unfortunately, there will not likely be much real growth in the budget over the next few years. Given your understanding of the historic problems of funding instability and stretchouts, can we afford all of these major new starts at this time?

Dr. **Gansler**. The question of can we afford certain new starts cannot be addressed in isolation. Even assuming that we have an approximately constant defense acquisition budget (in real dollars), it still means that one is forced to compare new starts against current programs. Perhaps, in some cases, it makes sense to terminate current programs at the expense of a new start, while in other cases it might make more sense to complete an efficient production program and delay the new start. (Notice that it rarely makes sense to continue an inefficient program—so we certainly have some candidates for termination.)

Nonetheless, it does appear that without a significant increase in resources and with the likely demand for increased quantity of conventional systems over the near term, that an extensive number of new starts will undoubtedly not be aforadable. This, however, does not mean that they need not be started in the pre-full-scale development phase. Personally, I think it important for the nation to increase its efforts on component, subsystem and prototype activities. Additionally, I think that a considerable increase in effort needs to to be made in terms of cost-reducing initiatives in the pre-full-scale development area. Specifically, in terms of using advanced technology toards lower cost weapon systems and in the areas of doing research on advanced manufacturing technologies that could dramatically reduced weapon system costs. Thus, in many areas of new weapon systems, it may well make sense to begin prototype and subsystem development without making a commitment to full-scale development and production. This will create options for us in the future that may, hopefully, provide increased military effectiveness at considerably lower cost. Since the overwhelming share of the $150 billion of acquisition dollars are in the full-scale development and, particularly, the production and support arenas, this option—of increasing the pre-full-scale development activities, while only initiating major programs that are affordable and terminating those that are not—seems to me to be a very attaractive route.

Once Congress and the DOD agree on an institutional mechanism for doing improved long-range resource and program planning, then it will be obvious what programs are "affordable" and which one ones are not. This will force both the DOD and the Congress to address the issues of termination of current programs and initiation of major full-scale development and production of new programs. Obviously, I would urge the Congress to concentrate on this important infra-structure change.

Senator **Bingaman**. This meeting is now adjourned.

[Whereupon, at 4:37 o'clock, p.m. the subcommittee adjourned, to reconvene upon the call of the Chair.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEARS 1988 AND 1989

TUESDAY, MARCH 31, 1987

U.S. SENATE,
SUBCOMMITTEE ON DEFENSE INDUSTRY AND TECHNOLOGY,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

DOD IMPLEMENTATION OF RECENT CHANGES IN ACQUISITION POLICY

The subcommittee met in open session, pursuant to notice, at 3:50 p.m., in room SR-253, Russell Senate Office Building, Senator Jeff Bingaman (chairman) presiding.

Present: Senators Bingaman, Nunn, Dixon, Gramm, and Pryor.

Staff present: Andrew S. Effron, counsel; Charles R. Siegismund II, system manager; Jonathan L. Etherton Kent Bankus, professional staff members; Kathleen L. McGuire, staff assistant.

Also present: Edward M. McGaffigan, Jr., assistant to Senator Bingaman; Leon Fuerth, assistant to Senator Gore; Jim Sayer, assistant to Senator Wirth; Alan Ptak, assistant to Senator Gramm; and Bill Wight, assistant to Senator Warner.

OPENING STATEMENT OF SENATOR JEFF BINGAMAN, CHAIRMAN

Senator BINGAMAN. Why don't we begin. I apologize for starting so late. That is the nature of the schedule around here with the full Senate in session, I fear.

Let me just say a few words here. I will cut the opening statement short and then defer to my colleague. We will then go ahead with Mr. Godwin's testimony.

Today the subcommittee begins its hearings on DOD acquisition policy. I think we have all been aware of the major attention that has been given in recent years to the problem of overpriced hammers and coffee pots, alleged cost overruns and delays, and allegations of defective weapons systems. In response to that, we took several actions in the last Congress, and our purpose this year is to assess what was done, determine which of it was correct, and assess the impact of the procurement statutes and regulations on the industrial and the technology base underpinning our defense.

It is imperative that the acquisition process not serve as a disincentive to innovation or risk-taking, and we need to assess the impact of the process on the timeliness of the delivery of our weapons systems to the field.

One of the major issues we are concerned about, of course, is the Under Secretary's authority and how that authority is being executed. Mr. Godwin is the first Under Secretary of Defense for Acquisition and comes to the post from a distinguished background in industry, as a manager and engineer, and has long been active in matters related to national defense.

After Mr. Godwin's testimony and questions from the subcommittee, we will hear from John Krings, the DOD Director of Operational Test and Evaluation. We will also hear from Derek Vander Schaaf, the Deputy Inspector General of the Department of Defense, and from Frank Conahan, the Assistant Comptroller General.

Why do I not defer to my colleague, Senator Dixon, for any opening statement that he has at this point.

Senator DIXON. Thank you very much, Mr. Chairman. I am going to save our time as well by placing my statement in the record. I appreciate the opportunity to do that, Mr. Chairman.

I am very delighted that Mr. Godwin is here. As the sponsor of the legislation providing for an Under Secretary of Defense for Acquisition, I have been very pleased with his efforts to date. We thank him for appearing today, and I am sorry that another hearing prevents my staying to listen to the testimony, but I assure him that everything he says here today will be carefully evaluated.

[The prepared statement of Senator Dixon follows:]

PREPARED STATEMENT OF SENATOR ALAN J. DIXON

Mr. Chairman, I am pleased to take part in today's hearing to review the Defense Department's implementation of recent changes in acquisition policy. The first witness will be the Honorable Richard P. Godwin, Under Secretary of Defense for Acquisition.

Just last year, the Congress approved my amendment which created the position of Under Secretary of Defense for Acquisition. I think this position should and will have a high level of visibility within the defense community, before Congress and the public. One of the significant issues facing Mr. Godwin is his Department's relationship with the military services in the implementation of the Packard Commission recommendations.

Mr. Godwin is also responsible for ensuring that the Defense Department is supported by an industrial base upon which it can depend. As I have said recently, I believe our defense industrial base is deteriorating before our very eyes. We need to work toward solving this problem now!

I will have some questions for Mr. Godwin which I believe will—if answered forthrightly—give this Senator a better feeling on how he perceives the duties and responsibilities of his position.

Thank you, Mr. Chairman.

Senator BINGAMAN. Thank you very much, Senator Dixon.

Mr. Godwin, let me go ahead and ask you to summarize your testimony. We do appreciate your coming before us today. I know you have had to wait to testify, so go right ahead.

STATEMENT OF HON. RICHARD P. GODWIN, UNDER SECRETARY OF DEFENSE FOR ACQUISITION

Mr. GODWIN. Thank you, Mr. Chairman, Senator Dixon. I will, as you suggest, summarize my remarks and make myself available for questions as you deem appropriate.

At the request of the subcommittee, I am prepared to talk today on the organization and the relationships I have with the various members of the Department of Defense. I would also like to discuss the status of the implementation of legislation which has been passed which is identified with the acquisition system and also comment on the regulatory and legislative simplification and streamlining program that is under way in the Department of Defense.

Let me start by saying that I am now operating under a directive which establishes the Office of the Under Secretary of Defense for Acquisition which, among other things, defines the subject of the acquisition system in the Department of Defense. Let me read it so that we will all be talking about the same general definition.

It defines that acquisition system as a single uniform acquisition system whereby all equipment, facilities and services are planned, developed, acquired, maintained and disposed of within the Department itself. It establishes the Under Secretary of Defense for Acquisition as having precedence in the DOD on acquisition matters after the Secretary of Defense.

It establishes the responsibilities and the authorities of the United States Under Secretary of Defense for Acquisition (USD(A)) and gives the USD(A) direct authority over the service and defense agencies on policies, procedures and execution of the acquisition system.

It also identifies the organizational elements reporting to me as the Under Secretary of Defense.

I do not propose to go into great length as to what our organization contains. Attached to my testimony are organizational charts which identify the organization of the Office of Under Secretary of Defense for Acquisition. It consists of four principal parts.

The first deals with the systems development portion, comprised of the Director of Defense for Research and Engineering and the C^3I portions of the undertaking of that group.

The second group is the Program Operations Group which conducts costs and programs analyses, performs long-range planning and administrative service acquisition programs that are reviewed by the various committees in the Department of Defense.

The Program Operations Office also is in the process of establishing an acquisition information system which I think is going to be a very important feature of the acquisition system. Embodied in the information system will be all the information that is input by the project managers at the sites. In other words, we will be working with information that has been placed in the record and is the operating data which the various committees will use to make decisions.

The need for such a system, of course, is apparent. This is something that industry has had for some time. We have lacked it in the Department of Defense at least as a single information system, and we hope this will remedy many of the problems which we have had in the past.

The third group in the office is the Office of the Assistant Secretary for Production and Logistics which manages materiel production, procurement, installation activities and assists in maintaining and enhancing our defense industrial base.

The fourth group is the International Programs Office which supervises the negotiations and performance of joint programs with our allies. It also provides coordinated oversight and management of the increasingly important element of the acquisition system associated with technological information and its transfer to our allies and others.

Another key element of the acquisition system is that associated with the reorganization of the services. The first step in this reorganization was to establish the position of Service Acquisition Executive which now exists within the three services and, I might add, the SDI group as well.

This requires that all the acquisition processes within the services fall under the purview of the acquisition executives; therefore, military services should be comprised of two principal parts. One is the military operations and those associated with the operating forces in the field. The other portion deals with the acquisition system which consists of those people involved in procurement and in the business of developing and procuring weapons for the military.

It also is intended to reduce the levels of management between the service acquisition executive and the program and project or laboratory installations themselves.

I will quickly touch on the activities of the Joint Requirements Management Board (JRMB). The JRMB is delegated to determine the acquisition requirements of each of the weapons systems. The JRMB will be redesignated as the Defense Acquisition Board, and its membership will include the Vice Chairman of the Joint Chiefs and the three service acquisition executives. The Defense Acquisition Board (DAB) will provide oversight for program milestone reviews, consider resource allocation requirements and develop and recommend policies related to the acquisition system.

I should point out here that earlier we reviewed the number of committees in the Department of Defense involved in acquisition matters, and there were 126. It was determined that this number was——

Senator **Bingaman**. Are those congressional committees you are talking about?

Mr. **Godwin**. No, these are our own internal acquisition committees. They all are either established by statute or were developed to support various portions of the system. As you will see in, I believe, Attachment 3, they are related, and their functions are tied into the various activities of the Department of Defense.

We have reduced the number of committees from 126 to 10, and, in theory, these 10 embody all the functions which are necessary to carry out the evaluation and coordination of the various weapons systems. I think their functions are shown on Attachment 4.

These changes are intended to evolve existing DOD practices into new methods of doing business, and this is part of our streamlining program. The system will be set up by establishing directives which define their definitive functions, authorities, and membership and at the same time will establish the ground rules for starting all new projects and a delineation of the guidelines that are to be followed in executing each of these projects.

Their activities will include, among others, the acquisition strategy to be used on all new starts, baseline planning, testing and evaluation, program cost and risk assessment.

I was also asked to comment on some of the ongoing activities which are related to the acquisition system. In Attachment 5, I have identified 14, starting with the Competition in Contracting Act upon which you asked that I comment.

In the interest of time, I would like to identify these 14 individual activities and submit them for the record. I am prepared to answer any questions you might have on them. These are ongoing activities as far as the acquisition system is concerned. We have taken the legislation as embodied in the Authorization Act of the last session and in the recommendations of the Packard Commission and others and are putting these into working order such that the answers to these tasks, you might say, will be available for your consideration later in this session.

With respect to the request in your letter of March 19 dealing with those recommendations which we may have or have had submitted to us for possible legislative improvement to ease the cumbersome rules and regulations which govern our acquisition system, we are busily at work refining and developing a system of alternatives. We have narrowed these down to six which we think will be submitted to the Congress at some early date.

These relate to the length of time required to award a contract. The present system is cumbersome and difficult to operate. In the area of excessive and cumbersome rules and regulations, some are the Department of Defense, others are Federal procurement regulations, and some are imposed by regulations from the various statutes. We are working on these, and I believe some of these suggestions have already been submitted to the Congress.

I think it was mentioned earlier to you that some 100 ideas have been submitted to us from the services all suggesting legislative recourse to improve, streamline, and shorten the now lengthy acquisition system procedures. We hope to have something in your hands to alleviate that problem.

We also would like to consider and are considering raising the dollar thresholds associated with the socioeconomic legislation. I think the complexity and time for issuance of procurement regulations is much too long, and we hope to have some suggestions in that area for you as well.

There is a lack of long-term, stable relationships with quality suppliers. We believe the incentive at the present time is to drive the procurement system toward the lowest price, not giving suitable regard for quality of the product, which we certainly need.

Finally, we are trying to identify and reduce the barriers to using more commercial practices and equipment in the day-to-day operations of the Department of Defense.

All of these problems require attention, and we are prepared to provide to you hopefully before the end of this session, more probably in the June–July period, some recommendations for legislation, starting with these six I have mentioned and probably including more.

Without going into any more detail, that is a brief summary of what I have submitted for the record, and I would be happy to answer any questions you might have.

[The prepared statement of Mr. Godwin follows:]

PREPARED STATEMENT OF RICHARD P. GODWIN, UNDER SECRETARY OF DEFENSE FOR ACQUISITION

Good afternoon Mr. Chairman, and members of the committee. I appreciate this opportunity to discuss with you the status of the acquisition improvements underway in the Department of Defense—especially since so many of you have played vital roles in the development and enactment of the initiatives and organizational adjustments that are the nucleus of our reform and reorganization efforts.

At the request of the subcommittee, my comments today focus on the progress we have made in implementing legislative acquisition policy requirements and the effects of some of these changes in achieving the goals of efficiency, economy and innovation in defense procurement.

Specifically, my remarks will address:

The status of the acquisition reorganization, including relationships and authority with respect to acquisition officials of DOD.

The status of implementation of legislative items identified in the subcommittee's letter of invitation.

Our program for regulatory and legislative simplification and streamlining.

To be fully responsive to all the items addressed in your letter of invitation, you will find additional details attached to this statement.

The basis for the organization of the Office of the Under Secretary of Defense for Acquisition is contained in DOD Directive 5134.1 [Attachment 1]. This charter:

Defines the acquisition system as a single uniform acquisition system whereby all equipment, facilities, and services are planned, developed, acquired, maintained, and disposed of within the Department of Defense;

Establishes the Under Secretary of Defense for Acquisition as having precedence in DOD on acquisition matters after the SECDEF;

Establishes responsibilities and authority of the USD(A);

Gives the USD(A) directive authority over the Services and Defense Agencies on Policy, Procedure and Execution of the Acquisition System;

Identifies the organizational elements reporting to the USD(A).

Our reorganizational efforts have been evolving since I arrived last fall. All OSD offices directly responsible for acquisition functions are organized under my purview. [Attachment 2]. This enables clear supervision and management control over the DOD acquisition system.

The revised defense acquisition organization includes the following groups: system development, program operations, material acquisition and international activities. As part of these groups:

The Director of Defense Research and Engineering will manage the research and development programs and serve as my scientific advisor.

Development testing is one part of this function. Operational testing also contributes to the acquisition system, but the Director of Operational Test and Evaluation reports directly to the Secretary of Defense.

The Assistant Secretary of Defense (Command, Control, Communications and Intelligence) (C^3I) will focus on development of command, control, communications and intelligence related equipment.

The newly created Office of Program Operations will conduct cost and program analyses, perform long range planning and administer service acquisition program reviews.

The Program Operations Office will develop and operate an acquisition information system for the entire DOD acquisition process. This system will provide timely status reports on all work in progress.

The system is modeled after the information systems in successful industries. It will provide an important tool necessary to maintain cost, schedule and technical performance on all programs, projects and in-house activities.

The Assistant Secretary of Defense for Production and Logistics will manage materiel production, procurement, logistics and installations activities and assist in maintaining and enhancing our defense industrial base.

The international programs office will supervise the negotiation and performance of joint programs with our allies and provide a single voice in international activities. This will provide coordinated oversight and management of this increasingly important element of the acquisition system.

To establish a uniform acquisition management process in the services. We began with:

Establishing service acquisition executive positions within the services.

Ensuring that all acquisition activities fall within the purview of the service acquisition executive (as shown in Attachment 3). Thus the military departments would have an operational side that concentrates command attention on military matters while the acquisition executive manages the acquisition more along business lines. In the future more work will be required to develop a cadre of experienced acquisition managers, a clear incentivized career path in acquisition and a means to train and retain qualified people.

Reducing the levels of management between the service acquisition executive and the program, project or lab manager.

The Joint Requirements Management Board (JRMB) was established to validate acquisition requirements and balance user requirements with design solutions to yield affordable, timely and effective systems.

The JRMB will be redesignated as the Defense Acquisition Board (DAB). Membership will include the Vice Chairman of the Joint Chiefs of Staff and the three service acquisition executives.

The DAB will provide oversight for program milestone reviews. Consider resources allocation requirements, and develop and recommend policy related to the acquisition system.

The review of the acquisition system identified approximately 126 separate committees, councils and panels active in acquisition matters. These committees will be disestablished and replaced by about 10 functionally discrete new operating committees to coordinate activities of acquisition system elements. The committees and their general areas of responsibility are shown in Attachment 4.

These changes are intended to evolve existing DOD practices into a new method of doing business. To this end we expect to issue a new acquisition system directive and instructions that will implement this new process or modus operandi. It will include:

The definitive function, authority, and membership of the DAB and its 10 reporting committees.

A streamlined procedure for program and project milestone reviews.

The ground rules for starting all new projects and a delineation of the guidelines that are to be followed in executing such projects to include: acquisition strategy; baseline planning; testing and evaluation; and program cost and risk assessment.

You also requested that I comment on the implementation status of acquisition policy requirements enacted in the recent past.

Attached to my statement [Attachment 5] are comments on each of the initiatives identified and two others. The initiatives are:

Competition in contracting act.

Enterprise programs and milestone authorization.

Nondevelopmental items (NDI).

Audit policy and oversight of contractor activities.

Undefinitized contractural actions (UCA's).

Competitive prototype strategy requirement.

Survivability and lethality testing.

Rights in technical data.

Profit and finance policy rules.

Improving the acquisition workforce.

Fixed price contracts for research and development.

Special tooling and test equipment.

Multiyear contracting.

Bid protest legislation.

We are at different stages of progress with each of these areas.

With respect to the request in your letter of March 19 for proposals to overcome difficulties created by current statutory requirements in the acquisitions process, our efforts to eliminate impediments to efficiency, economy and innovation in the acquisition process include:

An established pilot contracting activity program in which broadly representative contracting offices, selected by the military departments and defense logistics agency, will:

Identify procurement laws and regulations that are unnecessarily complex or restrictive and

Test innovative procurement methods. Within this program, the Services have been authorized to issue class deviations and waivers to any DOD procurement regulation not required by statute or Executive order.

We are working with the Office of Federal Procurement Policy on a number of actions.

Reviewing new and existing regulations and laws.

Developing a simplified Federal procurement statute.

Establishing policy that encourages and supports contracting officers' full use of their authority and flexibility.

The Service staffs have developed a list of over 100 ideas to improve the procurement process. Some of these ideas appear to have merit and a reasonable probability of improving the acquisition process. They will be reviewed for inclusion into a set of legislative proposals that respond to seven problem areas with the procurement process. These include: length of time required to award a contract; excessive and cumbersome rules and regulations; low dollar threshold aspects of socio-economic legislation; complexity and time for issuance of procurement regulations; lack of long term, stable relationships with quality suppliers; an overly judicialized bid protest process; and barriers to using commercial practices.

These will require review within the executive branch and clearance by the Office of Management and Budget before they can be submitted for your consideration.

It is imperative that we address these problems. I am concerned that many small to mid-size companies may be leaving, or choosing not to enter, the defense industrial base because of the frustration inherent in a contracting process which is complex, inefficient and time consuming.

Mr. Chairman, gentlemen, that concludes my prepared remarks. Thank you for the opportunity to review these important issues with you. I look forward to working with you as we continue to improve the DOD Acquisition System. I would be happy to address your questions.

ATTACHMENTS TO TESTIMONY OF MR. RICHARD P. GODWIN, UNDER SECRETARY OF DEFENSE FOR ACQUISITION

1. DOD Directive 5134.1, Subject: Under Secretary of Defense (Acquisition).
2. Defense Acquisition Organization (Chart).
3. Defense Acquisition Board (Chart).
4. Service Acquisition Structure Concept (Chart).
5. Status of Implementation—

Competition in Contracting Act
Enterprise Programs and Milestone Authorization
Nondevelopmental Items (NDI)
Improving the Acquisition Work Force
Fixed Price Contracts for Research and Development
Special Tooling and Test Equipment
Multiyear Contracting
Bid Protest Legislation

Department of Defense
DIRECTIVE

February 10, 1987
NUMBER 5134.1

ASD(C)

SUBJECT: Under Secretary of Defense (Acquisition)

References: (a) DoD Directive 5129.1, "Under Secretary of Defense for Research and Engineering," November 19, 1985 (hereby canceled)
(b) Title 10, United States Code
(c) DoD Directive 5000.1, "Major System Acquisitions," March 12, 1986
(d) Office of Management and Budget Circular No. A-109, "Major System Acquisitions," April 5, 1976
(e) through (i), see enclosure 1

A. PURPOSE

This Directive cancels reference (a) and, pursuant to reference (b), assigns responsibilities, functions, relationships, and authorities as prescribed herein, to the Under Secretary of Defense (Acquisition) (USD(A)).

B. DEFINITIONS

1. Department of Defense Acquisition System. A single uniform system whereby all equipment, facilities, and services are planned, designed, developed, acquired, maintained, and disposed of within the Department of Defense. The system entails establishing policies and practices that govern acquisitions, determining and prioritizing resource requirements, directing and controlling the process, contracting, and reporting to Congress.

2. DoD Components. The Office of the Secretary of Defense (OSD); the Military Departments; the Organization of the Joint Chiefs of Staff (OJCS); the Unified and Specified Commands; the Office of the Inspector General, Department of Defense (OIG, DoD); Defense Agencies; and DoD Field Activities.

C. RESPONSIBILITIES

The Under Secretary of Defense for Acquisition (USD(A)) is the principal staff assistant and advisor to the Secretary of Defense for all matters relating to the acquisition system; research and development; production; logistics; command, control, communications, and intelligence activities related to acquisition; military construction; and procurement.

1. The USD(A) shall:

a. Serve as the Defense Acquisition Executive with responsibility for supervising the performance of the entire DoD acquisition system in accordance with the policies, provisions, and authorities contained in DoD Directive 5000.1 (reference (c)) and Office of Management and Budget (OMB) Circular No. A-109 (reference (d));

b. Develop policy for acquisition plans and strategies, validate program acquisition requirements, and develop acquisition program guidance;

c. Set policy for acquisition matters, including contracting, research and development, production, construction, logistics, developmental testing, procurement, and training and career development of acquisition personnel;

d. Set policy for administrative oversight of defense contractors;

e. Serve as the DoD Procurement Executive, with responsibilities as prescribed in Executive Order (E.O.) 12352 (reference (e)) and 41 U.S.C. 401-419 (reference (f));

f. The IG, DoD shall coordinate audit and oversight of contractor activities with the USD(A) to prevent duplication of effort within the Department and unnecessary duplicative oversight of contractors.

g. Serve as the National Armaments Director and Secretary of Defense representative to the Four Power Conference. Develop memoranda of agreements and memoranda of understandings with friendly and allied nations relating to acquisition matters; and

h. Chair the Defense Acquisition Board (DAB) assisted by an integrated structure of councils and committees that relate to the acquisition process.

2. For each assigned area, the USD(A) shall:

a. Direct planning and special studies to analyze and evaluate the technical, economic, and military worth of programs in the acquisition system;

b. Develop policies, conduct analyses, provide advice, make recommendations, and issue guidance on DoD plans and programs;

c. Develop systems and standards for the administration and management of approved DoD acquisition plans and programs;

d. Develop plans, programs, actions, and taskings to ensure adherence to DoD policies and national security objectives, and to ensure that programs and systems are designed to accommodate cross-Service operational requirements and promote modernization, consistent with the readiness, sustainability, and efficiency of the Armed Forces of the United States and its allies;

e. Review and evaluate recommendations on requirements and priorities;

f. Review and evaluate DoD Component plans and programs to ensure adherence to approved policies, standards, and resource planning guidance;

g. In conjunction with the Assistant Secretary of Defense (Comptroller) (ASD(C)) and Director of Program Analysis and Evaluation, review proposed resource programs, formulate budget estimates, recommend resource allocations, and monitor the implementation of approved resource programs;

h. Fulfill planning, programming, and budgeting activities relating to USD(A) responsibilities;

i. Promote coordination, cooperation, and mutual understanding of all matters related to assigned activities, both inside and outside the Department of Defense;

j. Serve as primary focal point and principal spokesman for the Department of Defense and serve on boards, committees, and other groups pertaining to assigned functional areas, and represent the Secretary of Defense on USD(A) matters outside the Department of Defense;

k. Develop and maintain information management and reporting systems; and

l. Perform such other duties as the Secretary of Defense may prescribe.

D. FUNCTIONS

The USD(A) shall carry out the responsibilities described in section C., above, for the following functional areas:

1. Acquisition management.

2. Basic and applied research, design and engineering, and the development of weapon systems.

3. Command, control, communications, and intelligence programs, systems, and activities related to acquisition.

4. Logistics management, to include supply systems, spares program management, items standardization, transportation, energy, warehousing, distribution, and related activities.

5. Procurement activities.

6. Scientific and technical information.

7. Production and manufacturing.

8. Industrial base resources and productivity.

9. Force modernization.

10. Developmental test and evaluation, as defined in DoD Directive 5000.3 (reference (g)), and review and approval of the Test and Evaluation Master Plan.

11. Environmental services.

12. Assignment and reassignment of research and engineering and acquisition responsibility for programs, systems, and activities.

13. Codevelopment, coproduction, logistics support, and research interchange with friendly and allied nations, in coordination with the Under Secretary of Defense for Policy.

14. Installation management.

15. Construction, including construction funded by host nations under the North Atlantic Treaty Organization (NATO) Infrastructure program.

E. AUTHORITIES AND RELATIONSHIPS

1. The USD(A) shall take precedence in the Department of Defense on acquisition matters after the Secretary and Deputy Secretary of Defense. On all other matters, the USD(A) shall take precedence after the Secretary and Deputy Secretary of Defense and the Secretaries of the Military Departments.

2. The USD(A) shall direct the Secretaries of the Military Departments and Heads of other DoD Components on policy, procedure, and execution of the acquisition system. This includes responsibility for the development, management, supervision, and evaluation of acquisition systems and processes.

3. The Secretary/Deputy Secretary of Defense shall make decisions on acquisition milestones and resource matters, based on recommendations by the USD(A). The USD(A) shall prepare the documentation that reflects the Secretary/Deputy Secretary of Defense milestone decisions. These decisions shall be executed through the USD(A) for implementation by the Heads of DoD Components.

4. Where agreement on acquisition matters cannot be reached between the USD(A) and the Secretaries of the Military Departments, the matter shall be presented jointly to the Secretary/Deputy Secretary of Defense for resolution.

5. In the performance of assigned functions, the USD(A) shall:

a. Exercise direction, authority, and control over activities reporting directly to that official. These include:

(1) The Director of Defense Research and Engineering;

(2) The Assistant Secretary of Defense (Research and Technology);

(3) The Assistant Secretary of Defense (Acquisition and Logistics);

(4) Acquisition-related activities of the Assistant Secretary of Defense (Command, Control, Communications, and Intelligence);

(5) The Assistant to the Secretary of Defense (Atomic Energy);

(6) The Director of Small and Disadvantaged Business Utilization; and

(7) The Defense Advanced Research Projects Agency, the Defense Communications Agency, the Defense Logistics Agency, the Defense Mapping Agency, the Defense Nuclear Agency, and the Defense Systems Management College.

b. Provide technical guidance for utilization of the Electromagnetic Compatibility Analysis Center.

c. Provide policy guidance, goal setting, and management supervision for the Logistics Systems Analysis Office, Defense Logistics Studies Information Exchange, Defense Management Journal, Defense Material Specifications and Standards Office, Product Engineering Service Office, Weapon Support Improvement and Analysis Office, Defense Housing Management Systems Office, Defense Base Operations Analysis Office, and utilization of Federally Funded Research and Development Centers (FFRDCs).

d. Use existing facilities and services of the Department of Defense and other Federal Agencies, whenever practicable, to avoid duplication and to achieve an appropriate balance among modernization, readiness, sustainability, efficiency, and economy.

6. The USD(A) shall also:

a. Issue DoD Instructions, DoD publications, and one-time directive-type memoranda, consistent with DoD 5025.1-M (reference (h)), that implement policies approved by the Secretary of Defense in the functions assigned to the USD(A). Instructions to Unified and Specified Commands shall be issued through the Chairman of the Joint Chiefs of Staff (CJCS).

b. Obtain reports, information, advice, and assistance, consistent with DoD Directive 7750.5 (reference (i)), as necessary in carrying out assigned functions.

c. Communicate directly with the Heads of DoD Components. Communications to Commanders of the Unified and Specified Commands shall be coordinated through the CJCS.

d. Establish arrangements for DoD participation in nondefense governmental programs for which the USD(A) is assigned primary DoD cognizance.

e. Communicate with other Government Agencies, representatives of the legislative branch, and members of the public, as appropriate, in carrying out assigned functions.

f. Coordinate and exchange information with other OSD and DoD officials exercising collateral or related responsibilities.

g. Exercise the delegations of authority contained in enclosure 2 to this Directive.

7. Other OSD officials and Heads of DoD Components shall coordinate with the USD(A) on all matters related to authorities, responsibilities, and functions assigned in this Directive.

7. **EFFECTIVE DATE**

This Directive is effective immediately.

William H. Taft IV

William H. Taft, IV
Deputy Secretary of Defense

Enclosures - 2
1. References
2. Delegations of Authority

REFERENCES, continued

(e) Executive Order 12352, "Federal Procurement Reforms," March 17, 1982
(f) Title 41, United States Code, Sections 401-419, "The Office of Federal Procurement Policy Act," as amended
(g) DoD Directive 5000.3, "Test and Evaluation," March 12, 1986
(h) DoD 5025.1-M, "DoD Directives System Procedures," April 1981, authorized by DoD Directive 5025.1, October 16, 1980
(i) DoD Directive 7730.5, "Management and Control of Information Requirements," August 7, 1986

DELEGATIONS OF AUTHORITY

Pursuant to the authority vested in the Secretary of Defense, and subject to his direction, authority, and control, and in accordance with DoD policies, Directives, and Instructions, the USD(A), or in the absence of the USD(A), the person acting for the USD(A) is hereby delegated authority to exercise, within his assigned responsibilities and functional areas, all authority of the Secretary of Defense derived from statute, executive order, and interagency agreement, except where specifically limited by statute or executive order to the Secretary of Defense, to include but not limited to:

1. Exercise all authorities delegated to the Secretary of Defense by the International Trade Commission, Department of Commerce BDSA Del. No. 1, as amended (DoD Directive 4405.6, July 8, 1986).

2. Act for the Secretary of Defense in the exercise of extraordinary contractual action authority under P.L. 85-804—an Act to authorize the making, amendment, and modification of contracts to facilitate the national defense, August 28, 1958, in accordance with E.O. 10789, November 14, 1958, as amended, and Part 50 of the Federal Acquisition Regulation.

3. Make Secretarial determinations, justifications, and approvals on behalf of the Defense Advanced Research Projects Agency (DARPA), Defense Communications Agency (DCA), Defense Logistics Agency (DLA), Defense Mapping Agency (DMA), and the Defense Nuclear Agency (DNA) under Title 10, United States Code, with the authority to redelegate to the Directors of those Agencies, as appropriate.

4. Act for the Secretary of Defense in the establishment and granting of waivers under the Buy American Act (41 U.S.C. 10a-10b).

5. Act for the Secretary of Defense on delegations of authority to him by the U.S. Trade Representative to waive the prohibition against procurement from certain countries, pursuant to Title 3, P.L. 96-39, Trade Agreements Act of 1979 (19 U.S.C. 2511 et. seq.), and E.O. 12260, July 26, 1979.

6. Act for the Secretary of Defense in the exercise of authority delegated by the Administrator of General Services to dispose of surplus personal property and to waive prescribed demilitarization requirements under DoD Directive 4160.21, December 5, 1980.

7. Make determinations with respect to the donation of surplus personal property to educational activities of special interest to the Armed Forces of the United States as prescribed in DoD Directive 4160.25, April 30, 1984.

8. Act for, and exercise the powers of, the Secretary of Defense concerning requests for waiver of the navigation and vessel inspection laws of the United States under P.L. 891, 81st Congress, 2nd Session, December 27, 1950, (64 Stat. 1120), except on those matters that have been delegated by the Secretary of Defense to the Secretary of the Army.

9. Make recommendations to the Department of Energy in connection with facilities for transmission of electric energy and natural gas across borders of the United States, pursuant to the authority given the Secretary of Defense in E.O. 10485, September 3, 1953, as amended by E.O. 12038, February 3, 1978.

10. Act for the Secretary of Defense in the field of transportation and traffic management under Section 201(a), Title 11, of the Federal Property and Administrative Services Act of 1949, June 30, 1949, as amended (40 U.S.C. 481(a)) (DoD Directive 5126.9, June 18, 1979).

11. Act for the Secretary of Defense as the DoD claimant to other designated Executive Departments and Agencies for petroleum requirements and allocations in an emergency (DoD Directive 4140.25, May 15, 1980).

12. Exercise all responsibilities and authorities of the Secretary of Defense under Title 10, United States Code, Section 2404 with respect to the acquisition of petroleum.

13. Act for the Secretary of Defense in the implementation of OMB Circular No. A-109, "Major System Acquisitions," April 5, 1976.

14. Make the determination required by Title 50, United States Code, Section 1512(1), concerning transportation or testing of any lethal chemical or any biological warfare agent.

15. Submit the annual report to Congress on funds obligated in the chemical warfare and biological defense research programs, required by Title 50, United States Code, Section 1511.

16. Act for the Secretary of Defense for ensuring compliance with P.L. 92-463, the Federal Advisory Committee Act (5 U.S.C. Appendix), and make written determinations for conduct of all closed meetings of Federal Advisory Committees under his cognizance as prescribed by Section 10(d) of the Act, (5 U.S.C. Appendix, 10(d)).

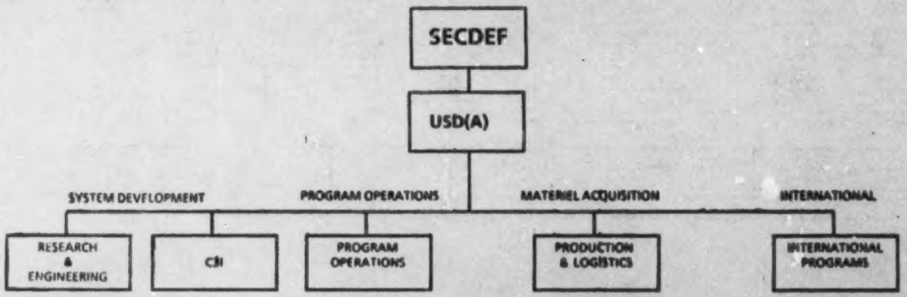
17. Act for the Secretary of Defense as the primary OSD interface with the Defense Policy Advisory Committee on Trade.

18. Act for the Secretary of Defense to make appropriate supporting determinations and execute leases under Title 10, United States Code, Section 2667.

19. Act for the Secretary of Defense in the implementation of OMB Circular A-76, "Performance of Commercial Activities," as revised, August 4, 1983.

The USD(A) may redelegate these authorities, as appropriate, except as otherwise specifically indicated above or prohibited by law or regulation.

DEFENSE ACQUISITION ORGANIZATION


SECDEF
USD(A)
SYSTEM DEVELOPMENT
PROGRAM OPERATIONS
MATERIEL ACQUISITION
INTERNATIONAL
RESEARCH & ENGINEERING
C3I
PROGRAM OPERATIONS
PRODUCTION & LOGISTICS
INTERNATIONAL PROGRAMS

- RESEARCH
- TECHNOLOGY EXPLORATION / VALIDATION
- CONCEPT DEFINITION
- ENGINEERING DEVELOPMENT
- PROTOTYPING
- MODIFICATIONS & UPGRADES
- FOREIGN TECHNOLOGY EVALUATION

- COMMUNICATIONS & INTELLIGENCE RELATED EQUIPMENT
- ENGINEERING DEVELOPMENT

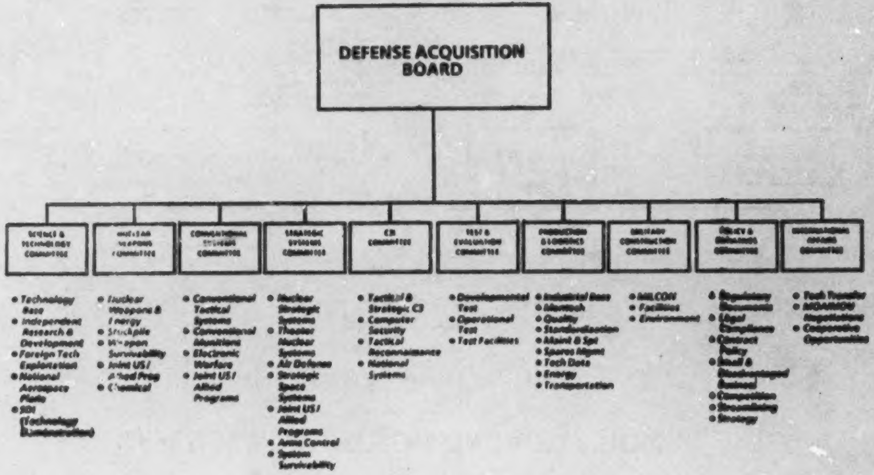
- SERVICE ACQUISITION PROGRAM REVIEWS
  - MILESTONE PROGRAMMING
  - BOARD & COMMITTEE MANAGEMENT
- COMPONENT - WIDE EVALUATIONS
  - MGMT INFO SYS DEVELOPMENT & OPERATION
  - OPEK COST TRAVEL ANALYSIS
  - PROJECT COST & SCHEDULE
  - EXCEPTION REPORTING
- PLANNING
  - LONG RANGE ACQUISITION PLANNING
  - BASELINE PLANNING
  - PPBS PLANS
- COST & PROGRAM ANALYSIS
  - MISSION & REQUIREMENT ANALYSIS
  - AFFORDABILITY ANALYSIS
- ACQUISITION PERSONNEL TRAINING

- PROCUREMENT
- MANUFACTURING / PRODUCTION
- CONTRACTING
- INDUSTRIAL BASE
- PRODUCTIVITY & QUALITY ASSURANCE
- STANDARDIZATION & TECH DATA MGMT

- INTERNATIONAL ACQUISITION PROGRAMS COORDINATION
- ARMAMENTS COOPERATION
- MOU NEGOTIATIONS
- TECHNOLOGY TRANSFER REVIEW

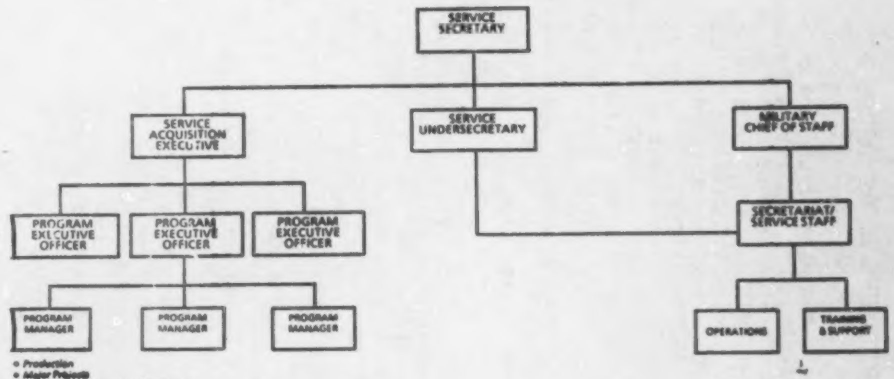
ATCH 2

DEFENSE ACQUISITION BOARD
(JOINT REQUIREMENTS AND MANAGEMENT BOARD)


DEFENSE ACQUISITION BOARD
SCIENCE & TECHNOLOGY COMMITTEE
NUCLEAR WEAPONS COMMITTEE
CONVENTIONAL SYSTEMS COMMITTEE
STRATEGIC SYSTEMS COMMITTEE
C3 COMMITTEE
TEST & EVALUATION COMMITTEE
PRODUCTION & LOGISTICS COMMITTEE
MILITARY CONSTRUCTION COMMITTEE
POLICY & INITIATIVES COMMITTEE
INTERNATIONAL AFFAIRS COMMITTEE
• Technology Base
• Independent Research & Development
• Foreign Tech Exploitation
• National Aerospace Plane
• SDI (Technology Demonstration)
• Nuclear Weapons & Energy
• Stockpile
• Weapon Survivability
• Joint US/Allied Prog
• Chemical
• Conventional Tactical Systems
• Conventional Munitions
• Electronic Warfare
• Joint US/Allied Programs
• Nuclear Strategic Systems
• Theater Nuclear Systems
• Air Defense
• Strategic Space Systems
• Joint US/Allied Programs
• Arms Control
• System Survivability
• Tactical & Strategic C3
• Computer Security
• Tactical Reconnaissance
• National Systems
• Developmental Test
• Operational Test
• Test Facilities
• Industrial Base
• Mantech
• Quality
• Standardization
• Maint & Spt
• Spares Mgmt
• Tech Data
• Energy
• Transportation
• MILCON
• Facilities
• Environment
• Regulatory Documents
• Legal Compliance
• Contract Policy
• Small & Disadvantaged Business
• Competition
• Streamlining
• Strategy
• Tech Transfer
• MOA/MOU Negotiations
• Cooperative Opportunities

ATCH 3

SERVICE ACQUISITION STRUCTURE CONCEPT


SERVICE SECRETARY
SERVICE ACQUISITION EXECUTIVE
SERVICE UNDERSECRETARY
MILITARY CHIEF OF STAFF
PROGRAM EXECUTIVE OFFICER
PROGRAM EXECUTIVE OFFICER
PROGRAM EXECUTIVE OFFICER
SECRETARIAT/ SERVICE STAFF
PROGRAM MANAGER
PROGRAM MANAGER
PROGRAM MANAGER
OPERATIONS
TRAINING & SUPPORT

- *Production*
- *Major Projects*
- *Research & Development Programs*
- *Contract Management & Procurement*

- *Logistics*
- *Test & Evaluation*
- *Intelligence Programs*
- *Industrial Base Resources & Productivity*

- *Environmental Services*
- *Installation Management*
- *Military Construction*

ATCH 4

COMPETITION IN CONTRACTING ACT

Efforts to improve competition under the impetus of the competition in contracting act (CICA) have produced dramatic results. The department-wide rate of competition in terms of dollars in fiscal year 1986 was $78.7 billion, or 57.2 percent of the total, with another $29.7 billion, or 21.6 percent of contract dollars being follow-on actions to contracts that were initially competed. In fiscal year 1986, our rate of competed procurement dollars was nine percentage points higher than the rate for 1985 and 17 points higher than fiscal year 1983. We are also continuing efforts to promote higher levels of competition at the subcontract level where the prime contract has been noncompetitive. Dual sourcing initiatives (allowing for two producers), advanced planning, and market research are just a few of the initiatives that have helped us to achieve these increases in competition that have occurred over the past several years.

One of the significant benefits to come out of CICA was the establishment of a competition advocacy structure charged with responsibility for enhancing the level competition in our contracting. As part of their efforts to improve competition, the competition advocates have effectively challenged contractors' assertion of the right to limit the government's use of technical data for purposes of competitive procurement of spare and replenishment parts. However, Section 953 of P.L. 99-500 limits our ability to challenge any restriction on our right to use technical data to a three-year period after final payment under the contract. This period of time can expire prior to the examination of purchase requirements for spare parts by our competition advocates, thereby eliminating or at least reducing their ability to take action to challenge the restriction. This may also enable us to compete our future spares requirements. Although earlier review by elements other than the competition advocates is possible, this legislation hinders efforts by the very effective competition advocacy structure.

The various thresholds for approval of other than competitive contracting actions appear to require some reexamination. For example, the threshold at which secretarial approval of other than competitive contracts under the competition in contracting act is currently set at $10 million. Where the acquisition is being effected by a major buying activity under the command of a general officer or Navy flag officer, we believe that delegations above $10 million threshold should be authorized.

ENTERPRISE PROGRAMS AND MILESTONE AUTHORIZATION

The FY 1987 Authorization Act, which created the Defense Enterprise Program, called for the Department to designate at least three Acquisition programs per Service as enterprise programs. According to the law, these programs would not be subject to any acquisition regulation, policy, or guideline of the Department of Defense other than statutory requirements and the Federal Acquisition Regulation (FAR). The Service Acquisition Executive would have the discretion to decline which regulations would continue to apply. The Secretary of Defense is responsible for the overall management and conduct of the Defense Enterprise Program.

The law further required that no less than three enterprise programs be requested for milestone authorization. Under this concept, the Congress could approve sufficient authorization to carry a program through a single acquisition phase, either full scale development or production (not to exceed 5 years).

After careful review, we have selected 10 programs to participate in the Defense Enterprise Program. They include:

Army

Mobile Subscriber Equipment (MSE)
Army Tactical Missile System (ATACMS)
Tube-launched, Optically-tracked, Wire-guided Anti-Armored Missile (TOW II)

Navy

Trident II D-5 Sea Launched Ballistic Missile
SSN-21 Seawolf Class Nuclear Attack Submarine
T-45 Navy Undergraduate Jet Flight-Training System

Air Force

C-17A Inter/Intra-Theater Airlift Aircraft
SRAMM II Short Range Attack Missile
Medium Launch Vehicle (MLV)
Titan IV Space Booster

Three of these enterprise programs will be requested for milestone authorization: MSE, Trident II, and MLV. In accordance with Congressional direction, baselines on these milestone authorization candidates will be delivered to the Armed Services Committees of the House and Senate. We selected these milestone authorization programs primarily because of their high priority.

NONDEVELOPMENTAL ITEMS (NDI)

With regard to using commercial products, we have formed a task force whose membership includes the Services and Defense Logistics Agency. This group is developing a comprehensive program that will examine all facets of increasing our use of commercial products, products and systems already developed by our allies, and other nondevelopmental items. The program includes requirements for introducing NDI considerations early in the requirements definition process; developing contractual incentives for use of the NDI at prime and sub-tier contractor levels; and reviewing military specifications to identify those which can be simplified to purchase commercial products. They will also be examining innovative techniques developed by the Services and defense agencies to make smarter use of the commercial market, including support, maintenance, and distribution systems, in order to make these techniques available to the rest of DOD. Two examples are:

- Defense Logistics Agency's paperless ordering placement system which utilizes contractor distribution to deliver products directly to customers without going through intermediate supply center storage and delivery; and

- Air Force Logistics Command competition for performance project which objectively evaluates offerors' past quality and delivery performance, as well as price, so that award can be based on the best value to the Air Force rather than relying solely on low price.

Changes to DOD directives and the Defense Acquisition Regulatory System are already in work. A regulatory reform test, aimed at identifying and eliminating regulations which inhibit acquisition personnel from making sound business decisions in the best interest of the government has also been established. The goal is to make it easier and quicker for contracting officers to get for managers and commanders, the quality products and services they need when they need them. We are confident that these initiatives, together with the changes being developed, will result in better use of commercial productions and buying practices.

IMPROVING THE ACQUISTION WORK FORCE

Sections 932 and 934 of Public Law 99-500 (Continuing Resolution Authorization) and Public Law 99-661 (FY 1987 Defense Authorization Act) contain identical language requiring the Secretary to submit a plan to Congress to enhance the professionalism of acquisition personnel (Due to Congress April 15, 1987), to recommend changes in existing law needed to support acquisition professionalism (due to Congress October 17, 1987), and concerning the coordination of defense acquisition educational programs (due to Congress October 17, 1987).

We are preparing the required responses and will cite an alternative personnel system proposal based on the China Lake personnel system as the plan and mechanism for improvement of the work force. The Department of Defense supports the alternative personnel system based on the China Lake.

Procurement training base reviews completed in December 1985 and 1986 have been utilized as the basis for addressing plan for coordinating educational programs. Although the results of these reviews are in the process of coordination within the Department of Defense, thought is being given to the establishment of a defense university of acquisiiton to provide a stable funding means and mechanism to review and coordinate training sources.

The 1986 Defense Authorization Act (PL 99-145) requires major system program managers to complete DSMC before assignment to the program, effective July 1, 1987. The 1985 Defense Authorization Act (PL 98-525) required new quality assurance personnel to have four weeks of training. These requirements have been folded into two DOD Directives issued December 9, 1986, to set mandatory training and experience requirements for procurement personnel, as follows:

Directive 5000.23 was issued to upgrade training and selection criteria for weapons system program managers, deputy program managers and other principle deputies and assistants. It will be effective after October 1, 1987.

Directive 5000.48 was issued to upgrade training and selection criteria of contracting, quality, assurance, purchasing and business management personnel. It was effective January 1, 1987.

FIXED PRICE CONTRACTS FOR RESEARCH AND DEVELOPMENT

Many studies, reports, and analyses have been done concerning causes of cost growth and possible solutions. One of the principal reasons for cost growth is the inherent uncertainty in research. Our national defense policy requires us to rely on advances in technology to retain a qualitative edge over the numerical advantage of potential adversaries.

We encourage people in the Department to be innovative. One possible solution to the risk problems associated with research and development contracts is the establishment of conditions that encourage a more realistic assessment of risk. Some of the Department's components have experimented with the use of fixed price contracts as one tool to bring about realism. It was anticipated that a contractor, when faced with the risk of loss above a fixed price, would be more conservative in design approach and cost estimates than if the government carried the burden of risk under a cost reimbursable type of contract. There are indications that the use of fixed price contracts for research and development may not produce desired results.

As indicated in the President's budget supplement for FY 1988, the Department continues to emphasize competition as a means to keep costs down, improve quality, encourage innovation, and strengthen the defense industrial base. This emphasis on competition, which is commensurate with the desires of the Congress as expressed in legislation such as the competition in contracting act and the requirement for dual sourcing of major programs, may be an overriding consideration for contractors. Rather than responding to our desire for realistic estimates, contractors may be motivated even more by the need to win the contract. Fixed price contracts, when used improperly have led to contractor claims and extraordinary relief.

The Packard Commission made recommendations for improving the defense acquisition process. Among them were a renewed emphasis on prototyping, stabilization of programs, and the expanded use of commercial products. These approaches to risk management, as opposed to risk transference, may be more promising techniques than the use of fixed price contracts in research and development to reduce the total cost to the government of our defense acquisitions.

SPECIAL TOOLING AND TEST EQUIPMENT

Special tooling is equipment that is of a specialized nature required for production of a specific end item. Their use on other programs is limited because substantial modifications or alterations are required to make it adaptable for other production requirements. Special test equipment is similarly designed to accomplish a specific test on specific equipment. Its use on other programs is also limited.

Section 9105 of the Appropriations Act of 1987 contained a requirement that no contractor may be reimbursed directly under a contract for more than 50 percent of the full cost of the special tooling and test equipment. We implemented this requirement with an interim rule on January 16, 1987, as required. The 50/50 participation in the cost of the equipment causes problems with respect to who has title - contractor or DOD or both. It also complicates the pricing of contracts concerning how the contractor will recover his cost and whether or not additional profit should be added.

A DOD working group comprised of representatives from OSD, the Services and defense agencies is conducting a study to determine the impact of this legislation and whether or not the policy is less costly or more costly to the government in the long run.

There have been concerns expressed that the policy will cost more due to the higher financing costs that contractors have to pay plus any added profit that may be attributable to contractor ownership. A potential benefit, however, is that if contractors fund these expenditures, more efficiency is built into the progress and a lower cost to the government may result.

Some contractors contend that the risk and cost involved may cause some contractors not to bid on government contracts.

We expect to complete our study in the near future and will establish a firm DOD position at that time.

MULTIYEAR CONTRACTING

Multiyear contracting on major weapons systems has been very effective in providing long term stability to our programs as well as significant savings to the government when compared to normal annual contracting. Since FY 1982, the Department has had approval for forty-five programs which will save an estimated $7.3 billion. We have submitted nine new candidates for the FY 1988 and 1989 budget submission. We estimate the savings will be slightly over $1 billion. However, lately there has been a legislative trend toward multiyear goals including those for projected savings. We feel that this is undesirable and unnecessary. We believe that it is better to examine all candidate programs on a case-by-case basis and to select those best suited for a multiyear strategy. Although savings of large proportions (ranging from 10 percent to 20 percent) are desirable prior to initiating multiyear strategy, a firm requirement to achieve a specified percentage (such as the 12 percent threshold specifed by Section 107 of the 1987 Defense Authorization Act (P.L. 99-661) discourages the use of multiyear contracts, as we cannot be certain that we will actually achieve the savings. However, there are other factors such as program stability which make the use of multiyear contracts desirable even where a commitment cannot be made to a specific percentage of savings. For these reasons we would like to discourage use of specifed firm percentage savings.

BID PROTEST LEGISLATION

The acquisition programs of the executive branch of the government operated for many years with GAO being the administratively agreed forum for the adjudication of protests. Although GAO's authority did not have a basis in law, the executive agencies administratively accepted its decisions. Over this extended period of years, GAO's decisions proved to be well founded and provided an established body of precedent. This provided the parties to any contractual matter a valid basis for determining their rights and could be used to establish necessary regulations. Altough the Competition in Contracting Act (CICA) provided statutory authority for GAO to rule on bid protests, it also provided for the General Services Board of Contract Appeals (GSBCA) to rule on protests involving the procurement of automated data processing equipment acquired under the Brooks Act. Additional authority subsequently was given to the GSBCA to include ADP services as well as to determine what procurements are under the Brooks Act. We understand that further legislation may be considered for the adjudication of bid protests. This is considered to be unwise. The establishment of new and multiple forums for protest adjudication can lead to differing precedents which in turn could lead to increased litigation.

Senator **Bingaman**. Thank you very much, Mr. Godwin.

One of our colleagues, Senator Pryor, is here, and he has had a very long standing interest, particularly in the test and evaluation area but also in acquisition generally. He had some testimony which I would like to ask him to give us right now, since he will have to run on. Then we will go to questions.

Senator Pryor, go right ahead. We are glad to have you here.

STATEMENT OF HON. DAVID PRYOR, A U.S. SENATOR FROM THE STATE OF ARKANSAS

Senator **Pryor**. Senator Bingaman and Mr. Chairman, thank you. I appreciate Mr. Godwin's standing aside for a moment. I do thank you, Mr. Chairman, for allowing me to briefly just stop in and give what I hope will not exceed a 3-minute statement.

I have a very special interest, as you know, Senator Bingaman, in what one of your witnesses, the Director of Operational Test and Evaluation, Mr. Krings, tells the committee this afternoon. It was just 4 years ago that Senator Roth and I wrote a bill that created the Operational Testing Office. In fact, I even attended Mr. Krings' swearing in at the Pentagon after opposing his nomination on the Senate floor. I do not know if I was welcome, to be honest; however, I did want to show my good faith effort in supporting what this new office was going to do.

My first concern today, Mr. Chairman, is related to a highly critical report requested by me, given by the General Accounting Office which was dated March 1987 which evaluated the way the Office of Operational Test and Evaluation actually does its business.

My second concern relates to Mr. Krings', I call it, misguided proposal that his office absorb the personnel and the functions of the developmental test and evaluation office. The GAO report charges that the Office of OT&E spends far too little time at test sites actually observing tests; two, inadequately reviewing most tests by relying on military service test reports rather than raw tests results; and three, does not provide uniform policy and procedural guidance to test officers or maintain adequate test records.

Mr. Chairman, in light of GAO's resoundingly negative report card on the Operational Testing Office, it is pretty remarkable that the Defense Department today is even considering a proposal that would place even more testing responsibility in that office.

While the GAO report is reason enough for concern, the reorganization proposal is flawed at a far more fundamental level. Conceptually, it makes no sense to require a man who tests and certifies a system at a developmental stage to turn around and be objective in his analysis of the same system during later operational testing which follows. That situation has the very same dynamics of forcing a student to grade his own exam.

Congress acknowledged the value of keeping the two testing functions separate and made it eminently clear in the 1983 legislation that established this new office. Again in last year's DOD reorganization bill that operational and developmental testing were to remain separate in separate functions.

As the GAO has illustrated, there are ways to get around an organizational structure that is supposed to engender effective and unbiased testing, but I can guarantee that any effort to compromise effective testing through bureaucratic reorganization will not slip by the Congress unnoticed, nor will it be unchallenged.

Mr. Chairman, once again I thank you. I would also like, Mr. Chairman, unanimous consent to submit for the record at the appropriate place a letter dated February 11 that I sent to the Honorable Sam Nunn, the chairman of the Senate Armed Services Committee. I understand also that this letter has been made available for you, but for the record, Mr. Chairman, I would like to submit that particular letter.

[The letter referred to follows:]

DAVID PRYOR
ARKANSAS

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Committees:
AGRICULTURE, NUTRITION, AND
FORESTRY
FINANCE
SPECIAL COMMITTEE ON AGING
SELECT COMMITTEE ON ETHICS

February 11, 1987

Honorable Sam Nunn
Chairman
Senate Armed Services Committee
United States Senate
Washington, D.C. 20510

Dear Sam:

As you know, the Director of Operational Testing and Evaluation has proposed that his office absorb the personnel, functions and policy responsibilities of the Under Secretary of Defense who controls developmental test and evaluation, including the newly established Live-Fire Test Program. I have very serious conceptual concerns about this reorganization, and I consider very questionable whether DoD can carry out this reorganization on its own authority.

In an attempt to clarify matters, I met with OT&E Director Jack Krings, but I felt compelled to close our meeting with a request to receive a written description of exactly what reorganization was being proposed. More recently, I have been informed that I will, indeed, receive this written explanation, but by the time I receive it, the reorganization will very probably be effected inside DoD by directive.

The American Law Division of CRS has looked into the legal aspects of this matter. The enclosed is its product. You will note that CRS puts some emphasis on Congress's intentions on this matter. As the author of the statute in question, there is no doubt in my mind that what we intended -- and, in fact wrote -- was to preclude exactly what DoD now proposes to do. In addition, provisions in last year's Goldwater-Nichols DoD Reorganization Act and a discussion with the Senate Legislative Counsel would also seem to argue against the internal reorganization's legality.

Should you share some of my concerns about this matter, I am hoping you would be willing to express them to the Defense Department before any final action is taken by directive -- which may be signed as early as the end of this week.

Sincerely,

David

David Pryor

Congressional Research Service
The Library of Congress

Washington, D.C. 20540

February 3, 1987

TO : Honorable Denny Smith
Attention: John Highbush

FROM : Andrew Mayer, Specialist in National Defense
Foreign Affairs and National Defense Division

SUBJECT : Proposed Merger of DOD Testing Functions

Section 1211 of the Department of Defense Authorization Act, 1984 1/ established the office of the Director of Operational Testing and Evaluation (OT&E) in the Department of Defense. The section describes in considerable detail the functions and duties of the Director. Although at the present time this office generally conforms to the statutory description, there have been reports in the very recent past that the DOD offices charged with the testing of weapons will be reorganized. As described in one periodical,

> the Pentagon will soon combine the three offices under an umbrella group headed by John Krings, director of operational test and evaluation. 2/

The article adds that

> the new unified test and evaluation office . . . is to conduct all operational and some developmental tests, Pentagon sources said. 3/

Accordingly, the question has been raised as to whether the proposed reorganization complies with the congressional intent underlying section 1211. At the outset, it should be mentioned that considerations of time have made it

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1/ Public Law 98-94, 97 Stat. 614, 684.

2/ Defense Week, January 26, 1987, p.1.

3/ Ibid.

impossible to conduct interviews with the DOD personnel involved; the description in this memorandum of the proposed reorganization is based entirely on the published source cited above.

The problem of reconciling the proposed reorganization with the statutory language lies in the concept of "independence," as that term is used in Public Law 98-94. As already noted, section 1211 sets forth in considerable detail the functions to be performed by the Director of OT&E: he is to prescribe policies and procedures for the conduct of operational test and evaluation in DOD; 4/ he is to monitor and review all operational test and evaluation in DOD; 5/ he is to analyze the results of operational tests on each major defense acquisition program; 6/ etc. Most significant for present purposes is section 136a(d), which provides as follows:

> The Director reports directly, without intervening review or approval, to the Secretary of Defense. The Director shall consult closely with, but the Director and the Director's staff are independent of, the Under Secretary of Defense for Research and Engineering and all other officers and entities of the Department of Defense responsible for research and development.

It seems clear that the Director of OT&E must not come under the jurisdiction of the Under Secretary for R&E. Whether combining the function of operational testing with the function of developmental testing violates the congressional intent is not so clear.

In order to understand what Congress meant by independence it is necessary to discuss some of the history of this problem. The legislative history of and Evaluation (PA&E), who was a witness before the Senate Governmental section 1211 is only a part of the background, since the question of how to organize

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4/ 10 U.S.C. 136a(b)(1), as added by section 1211.

5/ 10 U.S.C. 136a(b)(3).

6/ 10 U.S.C. 136a(b)(5).

operational testing has been debated within DOD at least as far back as 1970. Much of this history was summarized in the testimony of Russell Murray II, formerly the Assistant Secretary of Defense for Program Analysis and Evaluation (PA&E), who was a witness before the Senate Governmental Affairs Committee on the subject of testing procedures; his prepared statement was read into the Congressional Record during the debates on Public Law 9894.

As Mr. Murray noted, the Blue Ribbon Commission appointed in 1970 to examine a variety of defense problems concluded that DOD's operational testing -- as opposed to its developmental testing -- was "grossly deficient." 7/ Accordingly, in language very similar to that contained in the statute under consideration, it recommended that DOD

> establish an Operational Testing and Evaluation Group, within the Office of the Secretary of Defense, reporting to the Deputy Secretary of Defense. 8/

The importance of distinguishing between the two types of testing is emphasized by the description contained in Mr. Murray's statement:

> Developmental tests are conducted by highly trained scientists, technicians and specialists under tightly controlled, laboratory-like conditions to find out whether a new weapon meets its technical specifications. On the other hand, the operational tests that the Panel referred to are conducted in the field by run-of-the-mill Servicemen under conditions simulating wartime as closely as possible to find out if the weapon -- even if it does meet its contractual specifications -- will really be useful in combat. 9/

Mr. Murray's testimony recites in considerable detail the history of operational testing in DOD. While he himself initially argued -- as he argues now -- that it should be separated from developmental testing, the position of

> the USDR&E was that; as the acquisition executive, he should be responsible for all testing, developmental and operational, and

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7/ Congressional Record, July 14, 1983: S9951.

8/ Ibid.

9/ Ibid.

> that the ASD(PA&E)'s responsibility for operational testing should come not from the Secretary of Defense, but only by delegation from the USDR&E. 10/

Although the operational testing function was transferred to Mr. Murray's office in late 1977, the argument over independence continued, and this organizational setup did not last very long. As Mr. Murray points out,

> a year and a half after I agreed to take on the responsibility for operational testing, the Deputy Secretary finally decided to reverse the original decision and to return the responsibility to the USDR&E, where it had started, and where it remains to this day. (I.e., as of the time of Mr. Murray's testimony, in 1983).

It is perhaps of some significance that a major reason for removing the OT&E function from Mr. Murray's office was that he had been given a staff to perform this function which he considered to be substantially too small for the purpose. The issue was raised again in 1987 when Mr. Krings, currently in charge of OT&E,

> complained . . . that his staff is so small it would only be able to test 56 of the 155 major weapon systems it is responsible for tracking. 11/

Accordingly, it is argued, by combining the existing offices into one organization

> the Pentagon will be able to eliminate "duplicating oversight" of weapons tests while at the same time spreading the workload among some 62 test officials. 12/

In recent years, DOD's official position generally appears to have favored combining the two functions. In 1983, the Senate Committee on Governmental Affairs held hearings on DOD's testing function. 13/ Mr. Murray and a number

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10/ Ibid., p. S5592.

11/ Defense Week, Jan. 26, 1987: 1.

12/ Ibid., p. 15.

13/ U.S. Congress. Senate. Hearing before the Committee on Governmental Affairs on Management of the Department of Defense: Oversight of DOD's Operational Tests and Evaluation Procedures. S. Hrg. 98-150, part 5. June 28, 1983.

of other witnesses specifically supported the creation of an independent OT&E office, a change in organization which would have been effected by a pending bill, S. 1170, 98th Congress. On the other hand, the statement of Adm. Isham Linder, DOD's Director of Test and Evaluation, did not favor the change:

> Senate Bill S. 1170, which would establish a separate Director of Operational Test and Evaluation and give him certain budget and administrative responsibilities over Service operational testing, would appear to be advantageous in strengthening operational test agencies. However, its disadvantages are numerous. The concept of dividing test oversight and test policy responsibility in the Office of the Secretary of Defense, with one office presumably looking after development testing and another office watching operational testing is entirely inconsistent with the requirement to coordinate expensive and time-cosnsuming tests in a weapon development program. 14/

The 1983 hearings, therefore, included testimony by DOD which opposed carving out the OT&E function, and testimony from other witnesses that strongly supported it. (It should be noted that not all witnesses were so vociferous on this issue. The General Accounting Office, for example, found a number of deficiencies in DOD's testing procedures. However, on the question of separating out the OT&E function it concluded by stating: "While our work has not focused specifically on how DOD should be organized to perform operational test and evaluation, we nonetheless support a stronger OSD organization that is more involved in enforcing existing test and evaluation procedures." 15/)

The ultimate question, of course, is what Congress intended. Mr. Murray was vehement in expressing the view that OT&E must be made separate from developmental testing, and the fact that his statement was read into the Congressional Record by Senator Pryor, the principal sponsor of section

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14/ Ibid., p. 45-46.

15/ Ibid., p. 73.

1211, strongly suggests that Congress endorsed his position. Senator Pryor, in introducing his amendment, emphasized the need for organizational change:

> Because operational testing is tied so closely to the Pentagon's research and development arm, we have a situation where the developers and promoters of weapons also play a very direct role in passing judgment on their performance. 16/

Senator Bingaman likewise stressed the importance of an organizational change:

> With the formation of this new independent body I believe that the area of operational testing would improve substantially. 17/

Senator Levin was perhaps even more explicit:

> I am well aware that an office already exists within the research, engineering, and acquisition branch of the Pentagon which is supposed to fulfill the independent functions our legislation embodies, Mr. President. Unfortunately, the level of independence intended for that existing office has yet to be achieved. 18/

None of the remarks made by these and other Senators in the course of the debate on section 1211 was as explicit on this particular issues as was the testimony of Assistant Secretary of Defense Murray, but it is highly unlikely that such a detailed statement could have been readily made in a debate on this extremely lengthy piece of legislation. The substance of the remarks just quoted, together with the detailed analysis given by Mr. Murray, suggest that an arrangement or reorganization within DOD whereby the functions of OT&E and developmental testing were combined, or were routinely performed by the same personnel, would be difficult to reconcile with Congress' expressed intent in enacting section 1211 of Public Law 98-94.

If I can be of any further assistance you may reach me at 287-7611.

16/ Congressional Record, July 14, 1983: S9948.

17/ Congressional Record, July 14, 1983: S9948.

18/ Ibid., S9959.

Senator **Bingaman**. Thank you very much, Senator Pryor. We appreciate your comments.

Senator **Pryor**. I apologize to Mr. Godwin and to all the other witnesses for just racing in and racing out and taking up their time. Thank you very much.

Senator **Bingaman**. We appreciate it, and we will get into some of those same questions in a later part of this hearing and give Mr. Krings an opportunity to indicate his own position.

Mr. Godwin, let me ask you a couple of questions that occur to me here. As I understand, you have six major positions under you.

It is my information that three of those remain unfilled: The Director of Defense Research and Engineering, the Director of Program Operations, and the Deputy Under Secretary of Defense. Could you specify which of the positions are unfilled, what your plans are as to filling those, and what time schedule you are going to work at?

Mr. **Godwin**. That is right; they are not officially filled. We have an Acting Director of Defense Research and Engineering. The position of Manager or Director of Program Operations is being filled. His nomination has not been submitted but is in progress. There is an incumbent in training and identified. I was hoping to be able to announce that my deputy was on board, but I have not heard as of the present time whether or not he has accepted or is willing to serve in that capacity.

Senator **Bingaman**. So do I understand that filling these positions is imminent?

Mr. **Godwin**. That is my hope, yes.

Senator **Bingaman**. Let me ask, on the authority of your position, there was a great deal of debate when Congress established your position, of course, as to the nature of your authority and the extent of it. I gather there are still questions about that. The statute states that you have the authority to direct the secretaries of the military departments and the heads of all other departments of the Department of Defense with regard to matters for which the Under Secretary has responsibility.

The charter that the Secretary of Defense has given you states, and here is a quote from that: "Where agreement on acquisition matters cannot be reached between the USD(A) and the secretaries of the military departments, the matter shall be presented jointly to the Secretary or Deputy Secretary of Defense for resolution."

There are some who I gather understand that to be a misstatement of what Congress intended, undercutting your authority in that you essentially are being put on an equal footing with the service secretaries in these matters rather than being given the preeminent position.

Could you comment on whether you consider there to be a problem in the way your authority is defined in this DOD directive?

Mr. **Godwin**. I believe the interpretation which you gave is probably not correct. The directive clearly states that I have precedence over the service secretaries within matters related to acquisition.

The statement is intended to say basically that the secretaries cannot bypass me in seeking redress elsewhere; that if they seek a different decision or they want to override the one I have made, they have to go with me to the Secretary, and the decision would finally be made there.

The intent, of course, and the way the system is operating is the correct one. The Secretary has supported my decisions; consequently, I believe the system is working.

Senator **Bingaman**. Do you think there is any problem with regard to the issue of whether you are answerable to the Deputy Secretary of Defense as well as the Secretary of Defense? I gather there has been a question there as well as to whether just the Secretary of Defense can overrule your position.

Do you think that is another area that remains unclear, or what is your understanding of your authority with regard to the Deputy Secretary of Defense?

Mr. **Godwin**. My reporting relationship is directly to the Secretary. In the absence of the Secretary or as his alter ego, the Deputy Secretary acts for him from time to time. This is not anticipated by me to be a problem, but, of course, it depends upon the way the system works.

To date, I think it is working well in that I have had all the support I have needed. If this support continues, the system will work well.

Senator **Bingaman**. You have not encountered problems in that regard as yet?

Mr. **Godwin**. The "as yet" gives me a little trouble, but the fact is at the present time it is working well.

Senator **Bingaman**. OK. Let me ask a couple of questions that are prompted by earlier testimony that we received in the Readiness Subcommittee of this Armed Services Committee. Specifically, I refer to testimony that the Air Force Logistics Command, General O'Loughlin gave us. I do not have the date here, but it was earlier this month.

LEAD TIME FOR CONTRACTING

He said that in the Air Force Logistics Command, the average administrative lead time for contracting has more than doubled over the last 3 years. He goes on to say that, for example, today it takes an average of about 250 days to get a dollar on contract in AFLC. This leaves only 115 days a year to make all the hard decisions about what to buy, how much to buy, et cetera.

Then he goes on to indicate that this is a result of both legislation and regulations that have accumulated over the last several years.

Is it your sense that the problem in this area, the problem of making timely acquisitions, has worsened to that extent in the last few years?

Mr. **Godwin**. I think he is correct in saying that the length of time and the encumbrances to a timely acquisition process have increased and is more difficult now than it was.

I believe I identified, also, that this is a subject about which we are most concerned, and we hope to propose methods of alleviating the problem.

I might take issue with the length of time. He indicates 120 days or so. I think our experience, and we have had some recent studies on the matter, shows that it takes closer to 2 months or something in that vicinity, 60 to 80 days, which still is much too long for an acquisition system to perform well.

Senator BINGAMAN. Now, his example, he says that today it takes an average of 250 days.

Mr. GODWIN. Yes.

Senator BINGAMAN. You say it takes 60 instead of 250?

Mr. GODWIN. Sixty to 70 days would be a number that I am more familiar with and that we have just recently determined. Both of them are too long, let me say quickly.

Senator BINGAMAN. Are we talking about apples and apples here, I wonder? Am I misconstruing what his testimony is?

Mr. GODWIN. I do not think we are. The numbers that I have indicated were the numbers which are associated with a new solicitation. It takes approximately 60 to 80 days to give appropriate notice in the Commerce Business Daily, identify and issue a request for proposal, and then actually get the proposal on the street. Those are the times I am talking about.

You may be talking about the contract negotiations in which case we may have apples and bananas.

PROBLEM OF RISK-TAKING

Senator BINGAMAN. Yes. Let me ask about the problem of risk-taking. Some of the testimony we have received in the few hearings we have had so far indicates that our entire system of acquisition statutes and regulations are, of course, primarily focused on getting the lowest cost, and that one of the side effects of this whole set of regulations is that risk-taking has been discouraged to a very great extent. Not only have we built great time periods in for the process to function, but we have made it less likely that anybody would pursue an action which would involve some kind of financial or other risk.

Do you have some comments on that? Do you think that is an accurate characterization of what we have done in the acquisition laws?

Mr. GODWIN. Yes, I think it is. It is a question of degree, again. I think the thing that we have done is develop a system which puts too much emphasis on the lowest cost at the expense of quality. We have not provided in our acquisition or procurement system enough incentive to have someone give us a high quality product or, for that matter, to take a significant risk. We have not been a uniform contractor. We have not presented a uniform and a reliable contracting source for industry. This is my opinion.

We have gone too far in seeking or trying to shift the risk taking from the Government to industry. By that I mean, in the process of undertaking research and development, there is a high degree of risk not only with the results but the time it will take to solve the problems and to successfully deliver the product proposed in the contract.

Accordingly, a contractor undertaking, let us say, a fixed price contract for research and development, if he had an option he would probably not propose. We have a system where we are the principal buyer of such services in the United States, and they have to essentially take the conditions which we offer.

There should be a better way of distributing risk between the Government and the contractors, and we are trying to seek that happy medium. It is unfair to shift, because we are the only game in town, the risks, both financial and technical, to the contractors, thereby keeping the risk away from the Government. It is an enterprise which we should take on jointly.

PROFIT POLICY

Senator BINGAMAN. Let me ask about your profit policy. The Department proposed a profit policy last year that was embodied in the continuing resolution. We have heard some industry representatives indicate that they thought that policy would have a very negative effect on the defense industry, that it was going in the wrong direction.

What is your thought with regard to a profit policy? Is this something that you would intend to propose this year or go forward with?

Mr. GODWIN. You will recall at the end of the last session, legislation was passed which asked that we develop and issue new regulations relating to profit. This we have done, and we now have the statement of our profit policy in the record. This is an interim set of guidelines which we are operating under at the present time.

Senator BINGAMAN. Let me ask about the General Accounting Office proposal on this issue. Do you have a view as to the appropriateness of some kind of mandatory defense and commercial profit reporting system undertaken by someone outside DOD, which is what I understand is being considered by the General Accounting Office as a proposal?

Mr. GODWIN. Yes, I have heard there have been some suggestions along those lines. Our position is that we generally are opposed to the idea. I think adding another layer of review and judgment on an already fairly complicated system is going too far.

We would recommend that the present system, where we look to the GAO or others for redress, has been a successful one, and we would recommend that we stay with it.

PROCUREMENT PERSONNEL

Senator BINGAMAN. We have had a lot of debate in the last few years about the issue of procurement personnel and how to get the best possible people in that area as well. Do you anticipate recommendations to us as to ways of improving the quality of people and maintaining the quality and retaining good people in the procurement process? Is that something that you consider part of your mandate?

Mr. GODWIN. Yes, I do. I had included, as you probably read in my statement, and I did not touch on it here but am glad you have given me the opportunity, that I believe the acquisition system is a major part of the services' work. The acquisition system should provide a career path which is every bit as attractive as a military one in the operating military arm of the service.

We, therefore, have to handle our people in the acquisition system in a way which provides not only the training and background to carry out their jobs well but rewards them and gives them the opportunity for advancement as a good acquisition individual as contrasted to an officer in the field.

This requires that we adopt some modified personnel procedures much along the lines of those that are practiced at China Lake, and I think those are generally well known.

To answer your question specifically, the answer is yes. The acquisition system does need a cadre of skilled business managers. These people have to be trained and brought along as you would a specialist in any other field.

Senator BINGAMAN. So I gather you would support the Packard Commission's recommendation to expand the China Lake experiments to the entire Department of Defense with regard to acquisition personnel?

Mr. GODWIN. Yes, I would.

Senator BINGAMAN. Let me ask one other question, and then I will defer to my colleague.

STREAMLINING THE ACQUISITION PROCESS

As I understand what you said earlier, you would expect a series of recommendations to come to Congress to streamline the acquisition process, but you are expecting those to come in the June–July timeframe? Is that what I heard you say? You would not expect us to have anything in the next 30 days or so that could be included in this Defense authorization bill markup that the committee is aiming to complete sometime in April?

Mr. GODWIN. I doubt whether we could have specific legislative suggestions by that time. As you know, we started with seeking suggestions and ideas from the services, and we received over 100 ideas of areas where improvements could be made.

We have taken a lot of time to look into each and every recommendation categorizing those that the remedial action is through modification of our own regulations and standards or the Federal procurement regulations and standards, those we cannot do much about, and those requiring some kind of legislative relief. Those are the recommendations I am discussing.

We are hoping to have something to you in the June–July period which would be suggested legislative changes operated through the normal channels of pool and concurrence of OMB and others.

Senator BINGAMAN. Senator Nunn, did you have some questions for Mr. Godwin?

Chairman NUNN. I will just catch up, Mr. Chairman, and defer to you on most of the questions.

JURISDICTIONAL DIFFERENCES

The only one I want to ask about is where you stand on the jurisdictional, let us say, differences of opinion with the service secretaries. Do you have the authority that you now need in order to carry out your function as you understand it from the Congress?

Mr. GODWIN. Yes, I think I do. This has been a period, since I have arrived, of trying to develop a modus operandi or a method of doing business where I, in fact, could exercise the authorities which are necessary to do the job. In this interim period, we have worked out conditions under which I believe I can operate, and I think I have the authorities and the means of carrying them out that are necessary.

Chairman **Nunn**. If you make a decision on procurement and the service secretaries disagree, what happens then?

Mr. **Godwin**. If they disagree, the system intends that they come back to me for redress and try to reach some understanding as to a reasonable solution.

Chairman **Nunn**. Then what happens?

Mr. **Godwin**. Lacking that, they have a recourse of going with me to the Secretary.

Chairman **Nunn**. Both of you march in to the Secretary on equal terms, or they march in appealing from you, or what is the order of that?

Mr. **Godwin**. In matters of acquisition we march in with them appealing to me.

Chairman **Nunn**. So you make the decision, and they can appeal to the Secretary? Is that the way it is?

Mr. **Godwin**. Yes.

Chairman **Nunn**. It is not a matter of you both going in equally, then?

Mr. **Godwin**. I think we are going in equally in terms of we both report to the Secretary, but in matters of acquisition I have the precedence, and it would be an appeal to my decision.

Chairman **Nunn**. But if they want to appeal, they can appeal as many times as they would like on anything they would like to; is that right?

Mr. **Godwin**. I think, in theory, that is correct. I do not expect that to happen, however.

Chairman **Nunn**. That is on matters of acquisition?

Mr. **Godwin**. Matters relating to acquisition.

Chairman **Nunn**. Are there other areas where there would be, or could be, disputes beyond acquisition?

Mr. **Godwin**. There are borderline areas which are, you might say, not completely acquisition where we would possibly go in as equals. These areas deal more with programs such as international programs, matters of special access programs and those types of programs, but they are peripheral to the acquisition system. I can think of cases, none of which have come up, where we would go in as equals.

Chairman **Nunn**. Have you had any come up where you have had a disagreement on acquisition and had an appeal to the Secretary?

Mr. **Godwin**. Have I had some? Yes.

Chairman **Nunn**. How many, just roughly?

Mr. **Godwin**. Eight or 10.

Chairman **Nunn**. But with different service secretaries?

Mr. **Godwin**. With two different secretaries, yes.

Chairman **Nunn**. What was the general outcome? I do not care to get into any individual case, but was your decision upheld in eight of them, or was your decision overruled in half of them? What is the status?

Mr. **Godwin**. I have not kept count, but initially I had a very poor batting average, maybe 10 percent. In recent months, now that we have developed what I like to call a modus operandi or how we are going to perform, I think I have had about an average of 100 percent where I have been substantiated in my decision by the Secretary.

Chairman **Nunn**. Can you furnish for the record those cases so we can get some idea about what is happening? Congress is going to be very involved in this, and we may very well have some amendments proposed on this subject in the bill this year. I do not know of any now, but there very well may be amendments because there is some frustration as to whether you have the authority envisioned by the Congress on that particular score.

Mr. **Godwin**. Yes, I will be glad to.

Chairman **Nunn**. So would you give us sort of a case history of those that have been appealed, the merits on both sides, a sort of summary and what the decision was, the final decision by the Secretary?

Mr. **Godwin**. Yes. To the extent that I have all the information, I will give you the cases.

Chairman **Nunn**. As I understand it, you are saying that you probably deserved to lose on those that you are batting low in because you did not have your procedures outlined properly. Is that what you are saying?

Mr. **Godwin**. No, I am not saying that. I am saying that I did not carry the day with my point of view. I still think I am right, and some of those cases that came up initially have turned out the way I recommended.

Chairman **Nunn**. Have now turned up?

Mr. **Godwin**. Yes.

Chairman **Nunn**. You mean there has been a subsequent reversal?

Mr. **Godwin**. Yes.

Chairman **Nunn**. So you lost, but now it has been reversed again?

Mr. **Godwin**. Yes.

Chairman **Nunn**. By the Secretary?

Mr. **Godwin**. Yes, sir.

Chairman **Nunn**. So he has reconsidered some of his views?

Mr. **Godwin**. Yes.

Chairman **Nunn**. I think it would be very helpful if you could give us those in whatever form you think would be meaningful.

Mr. **Godwin**. All right, I would be glad to.

[The information follows:]

I have had several differences of opinion with senior acquisition executives during my first few months in office. These differences have included programmatic, budget and organizational issues.

I do not find this situation unusual. My mission is to improve the DOD acquisition system, and that means there are going to be significant changes to the way DOD does its acquisition business. Such changes will intrude on the way things have been done in the past. Consequently, differences of opinion are to be expected.

Several of these differences initially went against my recommendation. However, most of these have subsequently been settled.

I believe that the current authority provided to me by law, the contents of DOD Directive 5134.1, and the support given to me by Mr. Weinberger are adequate tools for resolving any future differences of opinion among DOD acquisition executives.

Chairman **Nunn**. Thank you, Mr. Chairman.

Senator **Bingaman**. Thank you very much.

OFFICE ORGANIZATION

Let me ask about your organization. In organizing your office, you have included a program analysis and evaluation function. As I understand it, the Office of Secretary of Defense already has a program analysis and evaluation organization headed by Dr. Chu.

How do you see these two offices interacting? Are they essentially doing the same thing, or is there some difference in their function? Does Dr. Chu report to you? How does this work?

Mr. **Godwin**. Dr. Chu does not report to me. There is a program, evaluation and cost control, cost analysis group in the Program Operations department or a group that I mentioned to you in my outline of the Offices of Under Secretary of Defense for Acquisition.

The functions they carry out are very similar to those that are carried out by Mr. Chu in his relationship to the Secretary. I felt that the function was more properly placed in the Program Operations Group, and we are developing a group there to carry out similar functions. They operate as the principal support for the Defense Acquisition Board where the questions of affordability, long-term costs and tradeoffs are really determined. That is why I feel that function is most properly there.

Senator **Bingaman**. All right, but you see no conflict there? Dr. Chu agrees with your proposed program analysis and evaluation function in your office? Is that a fair assumption?

Mr. **Godwin**. I think that is a fair statement. As a matter of fact, I believe Mr. Chu will end up managing that function as well. He may be dual-hatted by the time he is through.

COMPETITION IN CONTRACTING ACT

Senator **Bingaman**. The Competition in Contracting Act authorizes the services to give quality equal weight with cost in acquiring goods and services, but I continue to hear that contracting officers in the services are very reluctant to go with anything but the lowest cost bid.

Do you perceive this as a serious problem that requires some additional legislative attention, or is this not a problem?

Mr. **Godwin**. Yes it is a problem. As I mentioned earlier, we have to develop a method of selecting contractors, not based upon price alone. The quality, if not of equal importance, may be of more importance. We have to find a way to encourage and provide incentive to our contract managers to seek out the best source as measured on a series of determinations. One is quality, another is price, and a third is history of performance in the past.

That is a problem, and it is one that we haven't solved at the present time. I think, however, we can solve it via our own regulations and statutes.

Many of our people have become more governed by the fact that if it is not in the regulations, if it doesn't state they can do it, they don't. We would like to change that attitude to the position of saying if there is nothing that specifically precludes doing it, then they do. In other words exercise the flexibility and the judgment required to get the best product. That is a state of mind to some extent, and one that we have to develop in the acquisition system.

Senator BINGAMAN. Is it a state of mind which is somewhat dictated by the regulations and directives that are drawn up to implement the statutes?

Mr. GODWIN. I think there's some of that. There is a recent history of close scrutiny and bad judgment on the contractors' and the contracting officers' part which governs that to some extent. So no one is very anxious to take a chance and find themselves wrong. We would rather have it operate more on the good business basis and have the latitude to get the best possible for the Government's dollars.

Senator BINGAMAN. Let me ask about another aspect of the Competition in Contracting Act, there is an exception there to the use of competitive procedures in a situation where it is determined that the DOD wants to maintain or establish an essential research or engineering capability at a university or at a nonprofit institution.

I gather this is an exception which at least some believe has not been given as much attention as it deserves.

Have you had occasion to get into that question to see whether or not the exception that is provided for in the law for wanting to maintain this essential research and engineering capability is in fact being used, and the relationships between DOD and the universities are being maintained as was intended by that exception?

Mr. GODWIN. Yes, I have delved into it as I have been fairly close to it since I arrived.

My initial judgment would be that we are maintaining that important relationship. The universities and the independent laboratories are great national assets. We have to be careful to handle our relationship with them properly. We should concentrate on centers of excellence and support them to the maximum extent possible.

At the same time we need to recognize that researchers represent great expertise in various universities and that if we are careful to select the right ones, we can get a lot for our dollar. Overall the relationship with academia is an asset that we should protect closely. I think we are doing a relatively good job at this.

Senator BINGAMAN. All right. Senator Nunn, do you have any additional questions?

AGREEMENT ON ACQUISITION

Chairman NUNN. Let me just follow up. Since I asked the question, the directive of the Secretary of Defense on the very subject we are asking about has been brought to my attention. It says, "where agreement on acquisition matters cannot be reached between the USDA and the Secretaries of the military departments, the matters shall be presented jointly to the Secretary/Deputy Secretary for resolution".

Now it seems to me that that word jointly means equal. Do you read it otherwise?

Mr. GODWIN. You can read it as equal, yes.

Chairman **Nunn**. So really you are going in on matters of acquisition basically on the same level as the service Secretary in presenting issues to the Secretary of Defense, the way this reads.

Mr. **Godwin**. I think the way it reads, that's correct. It is the way the system operates that is important. In these matters the precedence is given to my determination, and I think I do in those instances have the final word.

Chairman **Nunn**. So, what does the designation Secretary/Deputy Secretary mean? Does that mean one or the other or does that mean both?

Mr. **Godwin**. The Secretary operates by considering the Deputy Secretary as an alter ego. They operate together or independently, but essentially as the same individual. In these matters, if the Secretary is away, then the recourse could be sought from the Deputy Secretary.

Chairman **Nunn**. Is there any other directive like this that you know of where the word jointly is used, or where the term Secretary/Deputy Secretary is used?

Mr. **Godwin**. No, I don't know of any.

Chairman **Nunn**. You have not looked at it though.

Mr. **Godwin**. I haven't studied it, but I don't personally know of any.

Chairman **Nunn**. Unusual arrangement though, isn't it? On paper at least.

Mr. **Godwin**. In business it would be, yes.

Chairman **Nunn**. It sort of defines the concept of command and chain of command, doesn't it?

Mr. **Godwin**. The management style of the Secretary makes it work relatively well. They can operate independently and they know each other's mind so well that they operate in a very complementary fashion. That has been my experience so far.

Chairman **Nunn**. How about the word jointly?

Mr. **Godwin**. Jointly refers to myself and whoever is raising the question. It really means that no one can go around me and get to the Secretary on an acquisition subject without my being there.

Chairman **Nunn**. You see that as a protecting word rather than a limiting word on your authority?

Mr. **Godwin**. Yes, I would like to be there when their case is made such that the reasons for my decision are known to the Secretary.

Chairman **Nunn**. Well, it would not surprise me if there was not some effort to have a statutory clarification of that regulation. If you have views on it, you might want to keep us informed.

Mr. **Godwin**. I will.

Chairman **Nunn**. It usually takes a regulation to define what the law meant, but in this case it may take the law to define what the regulation meant.

Mr. **Godwin**. Thank you, Mr. Chairman.

Chairman **Nunn**. All right. Thank you.

Senator **Bingaman**. I think we have a vote in progress, and we appreciate your testimony very much. That concludes the questions that I will ask. We do have a few additional ones that we will submit for a written response if we could, and again, we will look forward to your specific recommendations for legislative action we ought to take during this year.

Thank you very much. We will just adjourn the hearing here for about 10 minutes while we go vote, and then begin with the remaining witnesses.

[Recess.]

Senator BINGAMAN. Why don't we go ahead and get started again. I think we are behind in time here.

Mr. Krings, Mr. Vander Schaaf, and Mr. Conahan, come forward and we will have you summarize your statements, then I will try to ask a few questions of each of you.

Mr. Krings, why don't you go first please and summarize your statement or make whatever comments you want to in response to anything that Senator Pryor said or anything else. We are glad to hear from you.

STATEMENT OF JOHN E. KRINGS, DIRECTOR, OPERATIONAL TEST AND EVALUATION

Mr. KRINGS. Thank you very much Mr. Chairman.

I would like to request that my prepared statement be entered in the record.

Senator BINGAMAN. It will be included in the record.

Mr. KRINGS. Then I will try to summarize briefly.

In the past year, fiscal year 1986, our accomplishments validated the effort in Congress last year to maintain the independence of the Director, Operational Testing. I think that has proven to be a wise decision.

One of the things that we have been focusing on is improvement in defense testing and evaluation. In the short term, we find the most valuable area is in the discipline of the testing, to insure that in fact the testing is done, that it is planned properly, that the execution is disciplined, that the reporting is disciplined and independent, and that we remove opportunities to avoid testing or to avoid reporting.

Next in importance probably is realism, both within the testing itself, to insure that the testing is realistic with respect to the requirements for the equipment, and realistic in terms of the quality of reporting—that the reports are real reports.

The adequacy of testing is something that we obviously have to work on, but since we have to live with what exists to do testing, we have to do the best with what we have. It certainly suggests that we create a system in which future people sitting in this position don't have to blame us for not having provided the wherewithall to do testing better in the future.

We have tried to do our best to express the impact of the shortfalls in some of the assessments that have been done with respect to the facilities and equipment and threats et cetera that aren't really there. We really can't preclude fielding necessary systems right now based on the inadequacies of planning in the past. So we try to make the best compromise between the test which you would like to do, and the test which you in fact can do as a result of prior investment and prior focus.

In the long term, however, it begs the question of what are we going to do to improve these weaknesses or shortfalls that we are accepting at this point in time.

We have an ambitious effort to try to improve the capability and quality of testing in the future, and one of the most important things is to assess what we really have in terms of assets and capability to test right now. There has never prior to this been a central focus on what is really available throughout the Department of Defense to do testing. An even more difficult event is to determine which ones have the best capabilities and which ones should we in fact be investing in to get the best return on our dollars with respect to investment and test assets and capability.

This we are doing, but by definition it is rather difficult, because the resources are owned by three armed services who aren't particularly interested in expressing why they have come up short, and certainly in some cases don't particularly want to address how they are going to overcome shortfalls somebody else has pointed out to them.

We are having more success today than we did 6 months ago in assessing these shortfalls and what really exists out in the services, but with some degree of reluctancy on their part, I might add.

The new resources that are necessary to do testing well are very expensive, and we want to insure that we get the most out of them, in terms of multiuse, effectiveness, and productivity—so that a service doesn't get a test resource just because it asked for it, but because of its contribution to the overall testing plan in general. We want to actually do this on a competitive basis among the services to insure that we are in fact getting the best productivity from the investment from whatever service seems to be able to do the best job—not necessarily the job that they want to do.

We are going to try to overhaul the way we do business. We view testing as overhead. It's an absolute requirement to test because we are not perfect; but testing doesn't necessarily contribute directly to the product. It merely finds out what the weaknesses in the product are. So I think that, while certainly not reducing the effectiveness in testing, we should be looking at a better scheme to budget testing. I don't think that it should be an open ended contract. I think that one can assess the cost of testing and try to get enough testing and enough realism within a reasonable cost, rather than just an open ended, the more testing the better approach. There are points at which more testing is not better, it is just more expensive.

So we are trying to look at a scheme that would allow us to assess the costs of testing, and this becomes more dominant in the investment in facilities. Some programs absolutely cannot afford the cost of a test facility for their unique systems. Therefore, in many cases, it is just not provided. Whereas if we looked at a more consolidated investment strategy, in which other future participants might help defray the cost of this expensive test capability, it would be more fair and would insure that in fact those pieces of equipment or facilities are there. We would not have to waive the testing because of inadequate budgetary planning.

These are the efforts that we are trying to pursue at this point in time.

The Packard Commission mentioned the "divorce," as they called it, of development testing and operational testing. As noted by Mr. Godwin earlier and in discussions between the two of us, we clearly see that we have to have insight into the success of these weapon systems before they get to their final stage of operational testing. And that is the thrust of our effort to assess the progress of weapon systems through testing throughout their program lives, rather than waiting for an operational test at the very end solely to make the judgment on.

We intend to continue the pursuit of an operational test as a final exam, if you will, but it is a little late in some systems to wait until the final exam to get an independent objective judgment as to the progress of the particular weapon system.

We made a report to the Secretary of Defense in September with respect to Packard Commission recommendations. The subject was policies, techniques and organization for operational testing. We suggested a comprehensive independent oversight of testing with the goal of operational effectiveness and suitability being the most focal issue throughout the entire testing cycle. That is, the goal of all testing should be to produce an effective and suitable weapon system.

As a result of this discussion, the issue of consolidation of OSD-level test and evaluation oversight came up. And when we talk about consolidation we are talking about the consolidation of like activities that currently exist in two test and evaluation offices. There are many duplicated efforts, many common efforts between the two organizations.

Our goal was to try to consolidate these activities on a more efficient basis, but also to ensure that there was insight by the operational testers early in the life of programs to preclude them from reaching maturity with critical shortcomings.

This insight could be brought to bear early in the life of each program. It really means focusing on combat effectiveness and operational suitability throughout the life of a program with an objective view.

The Congress in its wisdom created us quite objective and quite independent. The Department of Defense has decided that perhaps this objectivity and independence can be further exploited into the area of testing done prior to operational testing. But I must add, there is one major exclusion. And that is any testing that is done by the developer. The developer can obviously be either a contractor or an arm of the Government. Whoever is responsible for the development of the weapons system—in other words, for making it work.

There is a certain amount of testing that goes on in order to achieve progress in development. This testing is not what I would call testing for score, it is testing to improve the product, to get it to the point where it can take the test for score, to determine if it should proceed along the acquisition process.

We would like to ensure that there is an arm's length separation between that person in the Government who is responsible for assessing progress toward the purchase of a weapon system and that person who is responsible for developing it. Because the developer clearly is an advocate, and his view of the results is sometimes quite a bit different than that of the buyer.

So in the process of expanding the role of operational testing, or consolidating some of these test activities, we would like to bring the objectivity and independence that exists in operational testing to that testing which is done prior to operational testing. This would be solely for the benefit of giving the decisionmaker candid, objective answers as to whether a weapon system is progressing as intended and will ultimately achieve the operational capability that is required.

This is the consolidation that we discussed—not a consolidation with the developer and with the person who is responsible for overseeing development, but in fact a consolidation of those activities that give the procurer a clearer view as to what the process of the program is without having to wait until it is mature to get an independent view.

The proposal that we have put together has been discussed both with the Secretary and with the Under Secretary for Acquisition. The three of us have pretty well decided how it can be done, and the efficiencies that would be created, as well as the effectiveness that it would bring to the whole system. In view of the concurrent programs that we see in the future, in which we will be trying to make judgments on acquisition at relatively early points in the lifetime of the weapon systems. I think it demands that there be an objective, independent arms—length assessment of the progress of a weapons system well prior to going in to operational test status. It should be made "through the eyes" of the ultimate user, in his terms of operational effectiveness and suitability.

We also suggested in our report to the Secretary that the services create a T&E executive. We didn't view it as a large organization or anything that would be particularly bureaucratic, but in fact would be focal to ensure that the services have an answer as to what they are doing in the realm of testing and how they are doing it, and how they are providing for the future of testing, both in terms of facilities and people.

So we have suggested this. In fact, the Army already has one, and the Air Force is seriously considering one at this point in time.

The real pluses of such an organization, the consolidation of independent and objective testing, really makes it possible to assure that every acquisition program is focused on the fulfillment of operational requirements, from inception to fielding, by institutionally establishing a continuity of all procurement T&E on a defense wide basis. I think it actually supports the expressions of Senator Pryor earlier that we want effective weapons systems and we want to ensure independent and objective testing—I would add, not only at the end of programs, but earlier in programs to ensure that we don't get too far along before we get this independent effective assessment.

The first order of business in any sort of consolidation though, absolutely and unequivocably, is to maintain and, in fact, enhance the independence of operational testing. I think that we have been able to do that, and we have been able to help the service operational test organizations maintain and enhance their independence. Our very presence and review of the activities that they pursue has added significantly to their independence.

During the Defense Review Board process last year, we were the champions of test and evaluation budgetary matters brought to the DRB. In that role I represented the entire T&E community, not just the operational testers. The argument that I brought there suggested, at least it suggested to the Deputy Secretary, that a Defense Test and Evaluation Council be created to represent a focal point for test and evaluation capabilities and needs in the future within the Department of Defense.

I was made the chairman of the council, and on it sit representatives of the services and the other agencies within the Department of Defense, which includes NASA, SDI, et cetera, who are also participants in utilizing test facilities and are heavy contributors in paying for these facilities.

Two areas of concern were addresses at the first Defense Test and Evaluation Council meeting. One was in the area of improved operational testing capabilities, and the other was in the area of needed space systems test capabilities.

As as result of these deliberations and a number of studies that were made and a petition back to the DRB as to what the final funding suggestion should be, the Department of Defense included $120 million in the fiscal year 1987 supplemental. This particular funding within the supplemental was dedicated to the development of operational test capabilities that were not identified in the fiscal year 1987 budget process, but the investigation for the fiscal year 1988–89 budget indicated these items were of an urgent nature and therefore were added to the fiscal year 1987 supplemental.

They include, and I certainly won't go through them all, but they include Army helicopter surrogates, devices that will emulate Soviet helicopters so that operational testing can be more realistic; deep, fast undersea targets so that we can truly exploit the capabilities of the torpedoes and other weapons systems that we are looking at in the Navy; and some instrumentation in terms of global positioning that does enhance operational testing by defining more clearly where the participants are during one of these realistic type operational tests. We also created a new budgetary line within the office of the Director of Operational Tests and Evaluation. We now have a budget line that the fiscal year 1987 supplemental would add money to that will allow us to directly apply the pressure to gain urgently needed operational test facilities and allow the services to compete for this acquisition.

The services will actually acquire the facilities at their locations, but we now have a more focal point to ensure that they have multiservice use and multidiscipline capability, rather than unilateral or narrow use.

This was a very big step, to go in the direction that we wanted.

I had some budgetary charts. I don't think the issue here is particularly budgetary so I would like to just defer that, leave that in my statement and not go through any more of these particular budgetary issues, hoping that you will have an opportunity to read it someplace else. So I will summarize. There have been significant test and evaluation policy and budget decisions made by the office of the Secretary of Defense in the last year. The creation of the Defense Test and Evaluation Council was very significant. It wasn't just symbolic to the rest of the Department of Defense that there will be more focus. It did create a forum to try to improve the productivity of testing and, we hope, to reduce the cost of testing with respect to investments so that in future years we won't have to say that we didn't adequately test things because we didn't have the facilities to do it.

It is an attempt to try to optimize these investments, and we are coming up with an investment strategy that does look at the whole picture of all weapons systems. Each investment has to be keyed to a future requirement to test, not just something that looks technologically interesting, but is in fact keyed to something that you are going to acquire.

We would certainly urge careful consideration of the supplemental to get us started and to catch up a little bit from where we are at this point. It also introduces a little bit of competitiveness in the acquisition of these multiuse facilities.

We are also stressing very heavily the involvement of industry and privatization of those facilities that do not have to be owned and operated by the Government. We have found, as many people up here have found, that with anything that can possibly be done in the private sector we really get more return on our dollars than if we own it and operate it as a Government facility. Those things that do not have an inherent reason to be owned and operated by the Government should certainly be looked at as candidates for exploiting private industry's capability to do these things. Industry does a lot of the testing. They own a lot of the facilities, and they know a lot about testing. We should exploit every opportunity to get them involved and take advantage of their competitiveness and their incentive.

The space systems test capability that I mentioned and did not elaborate on is a big number. Its facilities that have been scrubbed and rescrubbed, and I think that it is an open assessment of what really needs to be done in terms of future space testing—not just SDI, but any type of space testing. I think it makes for a more practical transition from early experimentation on to future development.

With respect to the consolidation of the two test and evaluation offices that I mentioned before, I would again say that we are trying to create a more objective measurement of the progress through the testing of new weapon systems, and to insure that it is done in the most efficient manner.

I would support wholeheartedly most of what Senator Pryor said in that we agree that it has to be effective, we have to remain independent, but I think that the only area that I would disagree with is that I don't think we are misguided in trying to make judgments earlier than at the end. His simile of the students grading their own papers—I guess what we are saying is we do not want the students to grade their own papers for 4 years and for the parent to find out that the child in fact did not graduate. We would like to have the parent aware of what the progress of the child is each year, rather than only finding out the day before graduation.

So I think there is a foundation for improved testing, started by the Department of Defense and with the insistence and suggestion and help from the Congress to get a productive and efficient and realistic system. But we recognize as you have, that it requires constant attention and persistence. We will attempt to institutionalize any of these reforms if we possibly can.

Thank you.

[The prepared statement of John E. Krings follows:]

PREPARED STATEMENT OF HON. JOHN E. KRINGS, DIRECTOR, OPERATIONAL TEST AND EVALUATION, DEPARTMENT OF DEFENSE

DEFENSE TEST AND EVALUATION

Chairman Bingaman and members of the subcommittee: Fiscal year 1986 was an eventful one for test and evaluation (T&E) in the Department of Defense. Much was accomplished by our office, both on a program-by-program basis and on broader policy and budgetary fronts. I believe these accomplishments serve to validate the wisdom of Congress in establishing the Director, Operational Test and Evaluation (DOT&E) as an independent official in the first place, and in preserving and strengthening that independence in the landmark acquisition reform and reorganization legislation enacted last year.

Improvement of Defense T&E is a substantial challenge. Our approach to it is twofold. In the near term, we are instilling a new discipline in the T&E process to ensure that the best possible job is done within the limitations imposed by prevailing management arrangements and the less than satisfactory T&E resources capabilities now at the Department's disposal. Moreover, we are seeing to it that the impact of these limitations on test realism and our ability to assess each weapon system's capabilities is candidly spelled out for decision makers. At the same time, we have begun an ambitious long-term effort to acquire sorely needed T&E resources and to overhaul the way we manage both those resources and T&E oversight.

Today, I am focusing on certain elements of the long-term effort, discussing watershed events that took place during fiscal year 1986 and on decisions and events that flowed from them during the first quarter of FY87. These have led to a significant new emphasis on and funding for T&E that is keyed to assuring procurement of combat effective and operationally suitable weapon systems and equipment. They have also directed Office of the Secretary of Defense (OSD)-level attention to the need for important T&E organizational changes to implement this new emphasis efficiently and effectively.

The submission of the Packard Commission's recommendations on defense management focused the attention of Congress and the Department on new approaches to defense acquisition. In addition to emphasizing the need for streamlined defense acquisition, organization, and processes, the commission noted the vital importance of early involvement of the operational test community in major defense acquisition programs and criticized what it called the "divorce" of operational testing and developmental testing.

The Department began immediately to implement those recommendations of the commission that did not require changes in law. Meanwhile, Congress acted on legislation mandating other major revisions of the Defense acquisition system recommended by the commission, notably the establishment of the new position of Under Secretary of Defense for Acquisition (USD(A)), vested with the authority to oversee and direct acquisition activities throughout the Department. This same legislation sustained and reinforced the independence of our office while underscoring the need for a cooperative working and advisory relationship between the USD(A) and the DOT&E—a relationship which is now being realized in practice.

One of the elements of the Department's effort to implement the Packard Commission recommendations was a comprehensive review of T&E techniques, policy and organization which the Secretary of Defense asked me to carry out last spring. This six-month review resulted in a report to the Secretary which recommended a major overhaul of T&E organization. The proposed changes are designed to provide T&E oversight at OSD and Service levels in a manner and with organizational and reporting arrangements parallel to but independent of the acquisition organization and process being established by the USD(A). The objective would be to establish top-to-bottom institutional arrangements to: (1) provide comprehensive independent oversight of all T&E carried out in support of procurement decisions; (2) assure that the Secretary of Defense, USD(A), Congress and other decision makers have the full benefit of objective T&E information and assessments at every step of the acquisition process; (3) reduce bureaucratic layering; and (4) provide for advocacy and utilization of, and efficient and effective investment in, T&E resources that enhance test realism—all to the end of delivering combat effectiveness and operational suitability more quicky and at less cost.

REFOCUSING TEST AND EVALUATION OVERSIGHT

The next step, of course, is to implement this new and more efficient organization of T&E oversight, assessment, reporting, and resource management.

Checks and balances are needed all along the way to keep the acquisition system focused on the bottom line of combat effectiveness and operational suitability from start to finish of every acquisition program. Such continuous independent T&E oversight, assessment, and reporting is critical for programs that warrant the use of concurrent acquisition strategies, which by their very nature lack traditional sequential decision milestones. Independent and comprehensive T&E oversight can make genuine success possible by providing decision makers with the timely and credible information they need to assess program progress.

Test and evaluation in support of procurement decision making must be focused to answer operational—"Will it work?"—questions. Responsibility and accountability for "enough testing," "enough realism," efficiency, and independent, timely reporting of results must be clearly established both within OSD and the Services. And perhaps most important, the Secretary and the Congress should have a single senior T&E official to work with who has the clear responsibility and authority for comprehensive oversight of T&E matters, including such critical items as survivability, lethality, and system-contractor involvement in operational test activities.

To begin with OSD, the Department has under consideration a proposal to consolidate all OSD-level oversight of T&E in support of procurement decisions in a single independent office. This would entail transfer of the responsibilities, staff positions, and other assets of the ODUSD(A) (T&E) to our office and the revision of pertinent DoD directives to preclude any possibility of compromising the objectivity of OSD T&E personnel, both in fact and appearance. Together with the additional 12 personnel positions recently authorized for our office, this would give us a staff of 58.

It should be noted that under this proposal T&E carried out by those responsible for engineering development of weapon systems—engineering T&E—would be outside the purview of our office. Such testing is an engineering development tool and should not be used by acquisition decision-makers to judge a weapon system's operational potential. Nor would it be appropriate for the independent assessors of a system's effectiveness and suitability to be involved in the engineering development process.

At the Service level, in our report to the Secretary which I mentioned previously, we recommended that each Service establish a civilian, secretariat-level test and evaluation executive. This official would be responsible for the full-time oversight of the Service's T&E programs and resources, and the Service operational test agency would report directly but not necessarily exclusively to him.

The Service T&E executive would, of course, advise and work closely with the Service acquisition executive, program executive officers, and program managers. He would keep his Service secretary, Service chief, and all key officials in the Service acquisition chain fully and currently informed on T&E matters. He would also be charged with facilitating communication between his Service OTA and our office and assure that all Service T&E information and reports provided to us are transmitted exactly as prepared by the OTA and other Service officials responsible for T&E planning, execution, and resource investment and management.

The proposed consolidation of T&E oversight responsibilities at the OSD-level, together with our suggestion for the creation of Service T&E executives, would establish clear, single-point Defense-wide T&E oversight and management structures and reporting channels similar and parallel to those on the acquisition side of the procurement equation. It would:

For the first time, provide oversight of all T&E in support of defense procurement decisions by an OSD-level official independent of developing organizations and officials and focus Service T&E oversight in a single, high-level official;

Make it possible to assure that every acquisition program is focused on fulfillment of operational requirements from inception to fielding by institutionally establishing a continuity of all procurement T&E oversight on a Defense-wide basis;

Give acquisition decision-makers the benefit of timely, unfiltered, unbiased T&E information and assessments based upon a comprehensive and focused perspective on each program's T&E activity, progress, and results;

Provide T&E advocacy and information focal points at the highest level in the DoD and the Services—assuring that all T&E resource requirements and other concerns can be addressed candidly and fully in such forums as the Defense Resources Board and the Joint Requirements and Management Board and throughout Service, departmental, and congressional budget processes;

Establish a basis for guaranteeing that all T&E concerns (e.g., resources; survivability, lethality, contractor participation and other test planning and scheduling concerns; facilities utilization) are adequately addressed, planned for, and accommodated with a coordinated, focused approach throughout the life of each acquisition program; and

Enhance efficiency as called for the by the Packard Commission by eliminating unnecessary duplication of effort, removing bureaucratic layers, simplifying T&E channels, and streamlining information flow between OSD and the Services.

TEST AND EVALUATION RESOURCE INITIATIVES

With the close of FY86 and the Department's FY88/89 budget cycle, the urgent need for improvement of Defense T&E capabilities and the contribution of T&E to the acquisition process was clearly recognized at the highest levels of the Department. Our office identified significant shortfalls in operational test and evaluation (OT&E) capabilities and in related funding proposals in the Services' program objective memorandums (POMs). Similarly, as a result of a six-month study we carried out jointly with the Office of the Deputy Under Secretary of Defense for Acquisition (Test and Evaluation) (ODUSD(A) (T&E)), shortfalls were identified in our capabilities for testing space systems.

I carried these issues to the Defense Resources Board during the summer budget review. These presentations led the Deputy Secretary of Defense to direct the establishment of the DoD Test and Evaluation Council (DTEC) and to appoint me to serve as its chairman. The DTEC is a permanent interagency body charged with reviewing T&E resource, policy, and budget issues and with making recommendations to the Secretary, Deputy Secretary, and USD(A) for action. The great majority of its work is carried out by ad hoc committees formed to do specific tasks and composed of representatives of the DTEC membership.

The DTEC's first task was to review the requirements for improved OT&E and space-test capabilities and make recommendations to the Deputy Secretary to support decisions for the FY88–89 Defense budget. As a result, the Deputy Secretary decided: (1) that the need for improved OT&E capabilities and realism was so urgent as to justify requesting a $120 million FY87 supplemental appropriation for this purpose, with required continuation funding included in the FY88–89 request; and (2) that substantial funding in support of acquisition of improved space-test (primarily developmental test) capabilities would be included in the FY88–89 request.

Two new OSD program elements (PEs) were created for these efforts to provide a much needed national-level focus on management of T&E resources investment. Our office was charged with the responsibility for managing the OT&E Capabilities Improvement PE (64340D) and the ODUSD (A) (T&E) with that for the Space-Systems Test Capabilities PE (64941D).

OPERATIONAL TEST AND EVALUATION (OT&E) CAPABILITY IMPROVEMENT (OCI)

When the Department approved our request for additional OT&E capabilities funding in FY88 and beyond, it was also determined that FY87 supplemental funding should be pursued because of the critical need to acquire a conventional OT&E capability to enhance test realism and the opportunity to invest funds immediatley and effectivety. The $120 million in the supplemental request is intended to be allocated as follows:

$34M—Army Helicopter Surrogates
$10M—Navy Deep, Fast, Undersea Targets
$30M—DUSD(A)(T&E) GPS Instrumentation
$46M—DOT&E OT&E Capability Improvement (OCI)

DOT&E was the department advocate for the issues containing all of these programs, but each segment has since been taken up by its appropriate organization and program element. I will expand upon and explain our segment, OCI.

Assuming approval of the supplemental, OCI funding is projected as:

[In millions of dollars]

	Fiscal years—			
	1987	1988	1989	1990
Total for PE 64340D	46	93	138	[1] 183
Instrumentation	4	23	25	90
Threat Simulators	39	66	93	77
Infrastructure	—	—	17	13
Management	3	4	3	3

[1] Continuing.

This program supports the development of a national capability for operational testing in a realistic environment. In the main, the capability to conduct adequate, realistic OT&E does not exist today.

OT&E is conducted using facilities designed primarily for development testing and/or training, resulting in limitations on test realism (e.g., current threats, representative terrain and weather, accurate force-on-force instrumentation, integration of red and blue forces, valid end-game solutions, survivability determination). This program element will fund the core program necessary to establish a mobile/transportable OT&D capability to test weapon systems in a realistic air-land battle scenario, with a secondary ability to support training and development test activities.

Funds will be used to acquire instrumentation that will permit mobility along with an increase in accuracy, number of participants, and utility. This is not a duplication of the DUSD(A) (T&E) instrumentation effort, but an enhancement and expansion to fulfill the OT&E requirement for mobility. Funds will also be used to acquire threat simulators necessary for test realism and survivability determination.

These projects are required to launch a focused, cohesive national capability to conduct OT&E of conventional weapon systems in the most realistic environment that is reasonably attainable. Improved OT&E capability will allow DoD to make better acquisition decisions and to better understand our current combat potential with existing weapon systems. This will be a continuing program as additional instrumentation and threat requirements are reviewed by the DoD Test and Evaluation Council and validated by our office. The acquisition of the individual elements in the various projects will be executed on a competitive basis among the Services, with an emphasis on involving the private sector to the fullest possible extent to achieve innovation, efficiency, enhanced productivity, and cost effectiveness. The Service with the best proposal—as judged by our office—will be the executing agent for that particular element.

SPACE SYSTEMS TEST CAPABILITIES (SSTC)

Existing test facilities are inadequate for the new technologies associated with space systems currently under development—such as kinetic and directed energy weapons, space surveillance systems, and hypersonic propulsion systems and materials that will enter full-scale development in the late 1980s and 1990s. In fact, today's facilities are barely adequate to support the experimentation and feasibility demonstration phases for these technology programs, let alone the DT&E and OT&E that will be required as they mature.

The office of the DUSD(A) (T&E) and our office jointly conducted a study to accurately identify these inadequacies, examining both developmental and operational T&E needs through the year 2010. The first-cut analysis by the test community identified requirements (primarily DT&E) for an investment of approximately $10 billion, most of that needed before FY97. After a rigorous analysis to eliminate duplication and items that were not clearly needed to support space testing, the requirements were reduced to a total under $7 billion. Although this sum might seem on the surface to be extravagant, such a program would approximate the size of previous government investments in T&E facilities for jet propulsion and wind tunnels and would require $2.3 billion dollars during the Five Year Defense Program (FYDP) period FY88-92.

During the summer Defense program review, this $2.3 billion requirement was presented to the DRB. Since the SSTC is a truly national test requirement essential to the acquisition of operationally effective and suitable space technologies, we proposed that all weapon system RDT&E and procurement accounts be assessed about 0.33%, so that all potential users of test facilities would contribute on an equal basis to the cost of T&E facility upgrades. The DRB decided that the SSTC requirement and the funding methodologies warranted further study and more input from potential users. Consequently, the DoD Test and Evaluation Council was tasked to review the SSTC. The DTEC reviewed the requirements with the Services and recommended funding the highest-priority requirements—in the $1.5 billion range over the FYDP. The Deputy Secretary of Defense decided in December 1986 that the primary programs driving the need for space-related test facilities should, for the most part, fund them. Consequently, FY88-89 hypersonic test facility funding was directed to be absorbed by the National Aerospace Plane program, while the majority of the SSTC funding was directed to be absorbed by the Strategic Defense Initiative Organization. Although, as mentioned previously, there is an outyear (FY90-92) "tail" to the SSTC, that portion was left for reconsideration in the FY90-91 budget, based on studies conducted in the interim.

The approved program included in the FY88-92 FYDP will initiate studies and some capability modifications in FY88, with most capability and facility improvements beginning in FY89 or later. SSTC funding is recapped below.

SSTC FUNDING RECAP

[Dollars in millions]

	1988	1989	1990	1991	1992	FYDP Total
Nuclear Effects	12	19	12	14	24	81
Propulsion Test Facilities (in Air Force Budget)						
Hypersonic/Structures Fac. [1]	30	11	26	40	15	122
Computational/Simulation Fac	0	0	14	14	5	33
Control Ctr/Com/Data Process	0	18	30	9	0	57
Target Systems	2	2	4	5	12	25
Advanced Aerospace Vehicle	0	0	8	35	59	102
Electronic Combat Capability	0	0	12	17	22	51
Sensor Test Facilities	16	21	25	6	7	75
Weapons Effects Facilities	5	31	109	138	82	365
Tracking/Telemetry Upgrades	11	57	42	69	98	277
Space Guidance Test Facilities (Reserved)						
Space Range Capability	2	12	41	57	110	222
Space System T&E Facility [2]	2	5	10	21	42	80
Total	80	176	333	425	476	1,490

[1] Funded in the NASP program. Remainder of the SSTC is funded in the SDI program.

[2] $2 million, FY88, and $5 million, FY89, are included in an OSD PE (64941D) to oversee SSTC study efforts.

Note: FY90-92 requirements will be viewed again as part of the FY90-91 budget process and are shown here only to indicate the magnitude of the total requirement.

It is my firm conviction that the policy and budget decisions made by OSD during FY86 and early FY87 have laid the foundation for a greatly enhanced ability to acquire weapon systems and equipment that meet the operational needs of the men and women of our Armed Forces, and to do so on a timely and cost-efficient basis. We must now erect the organizational structure needed to capitalize on this opportunity and responsively address such key issues as survivability, lethality, OT&E capability, and space test capability.

I sincerely hope that all concerned will come to share my belief that we are on the right path, and look forward to working with Congress, the leadership of the Department and the Services and the men and women of the T&E community in both government and industry to fulfill the promise that this new departure offers for our nation's defense.

Mr. Chairman, I will be pleased to answer any questions you and the members of the subcommittee may have.

Senator BINGAMAN. Thank you very much.

Senator Gramm had to go to the floor to try to keep the President's veto from being overriden on the highway bill.

Let me go ahead before I ask you questions, Mr. Krings, and hear the testimony of Mr. Vander Schaaf and Mr. Conahan. I will then have questions for each of you.

STATEMENT OF DEREK J. VANDER SCHAAF, DEPUTY INSPECTOR GENERAL, DEPARTMENT OF DEFENSE

Mr. VANDER SCHAAF. Thank you, Mr. Chairman.

It is a pleasure to appear before this subcommittee and discuss the role of the Inspector General in the Defense Department's acquisition process.

I have a very short statement, about 2 pages, which summarizes a rather lengthy statement I provided to the committee, I hope the committee staff and you have an opportunity to review that statement in more detail.

I want to tell you since the inception of the IG in the Department of Defense, we have recognized that our No. 1 priority has been finding ways to improve the way the Department acquires the equipment and services that are so needed for our national security.

In pursuing this goal, we have made several major improvements in the way auditors, inspectors, and investigators look at Department of Defense programs.

We have continually increased the amount of audit time devoted to contract administration, major weapons system acquisition, and contract pricing. It is now at 60 percent of our total audit time.

We put in place an aggressive audit follow up organization that results in more timely and proper resolution and disposition of internal and contract audits.

We have used the contract audit policy and oversight responsibilities given to the Inspector General by Congress to bring about changes which have dramatically improved the effectiveness of the Defense Contract Audit Agency.

These substantial improvements in the effectiveness of both internal and contract audits are coupled with dramatic improvements in our criminal investigative capabilities.

We have built a highly professional group of white-collar crime investigators who help to detect and prevent fraud anywhere in the procurement process. Today we are pursuing the key areas of product substitution, cost mischarging, defective pricing, bribery and kick backs.

Finally, the IG began to inspect activities on a functional basis. We recently completed a thorough inspection of the Defense Contract Administration Services, a key component in the day to day administration of our contracts.

I am sure you will want to pursue that subject of contract administration with me in more detail in a moment.

The balance of my prepared statement provides highlights of our activities to improve the acquisition process.

I would also like to indicate that we provide the Congress semiannually a detailed report of what we have performed and accomplished during that 6 month period.

Before I close, I think I should also discuss at least briefly the issue of duplicate oversight of contractors by defense activities.

This issue was addressed in the Defense Acquisition Improvement Act of 1986, which provided that the Under Secretary of Defense for Acquisition would be responsible for prescribing "policies to ensure that audit and oversight of contractor activities are coordinated and carried out in a manner to prevent duplication by different elements in the Department, and that in carrying out this responsibility, the Under Secretary was to consult with the Inspector General of the Department of Defense."

We fully support this provision since audit policy remains an IG responsibility, as we will work with the Under Secretary of Defense for Acquisition to develop effective long term solutions to the problem.

Unfortunately, some members of the contracting community would like to see our contract audit and oversight policy function diminished. They have the misconception that decreasing the IG's role will somehow enhance the role of the contracting officer. Frankly, I don't believe that is at all appropriate, or the way to go.

Mr. Chairman, that concludes my statement and I will be happy to answer your questions.

[The prepared statement of Derek J. Vander Schaaf follows:]

PREPARED STATEMENT OF DEREK J. VANDER SCHAAF, DEPUTY INSPECTOR GENERAL, DEPARTMENT OF DEFENSE

Mr. Chairman: It is a pleasure to appear before your subcommittee to discuss the role of the Inspector General, Department of Defense, (IG, DOD), in helping to ensure the integrity of the Defense acquisition process. Since its inception, the IG, DoD, has recognized that its number one priority must be improving the way in which the Department acquires the equipment and services necessary to provide for national security.

In pursuing that goal, we made several major improvements in the way auditors, inspectors, and investigators look at DOD programs. We have increased the amount of audit time devoted to contract administration, major weapon systems acquisition, and contract pricing. The amount of effort devoted to procurement matters has risen from about 10 percent of our total staff in FY 1982 to over 60 percent at present.

We recognize that finding a problem and recommending a solution is only the first step in improving management. For that reason we put in place an agressive audit followup organization to bring more discipline to the audit process. The increased emphasis on audit followup has meant timely and proper resolution and disposition of internal and especially contract audit recommendations.

Among the most important authority provided the IG, DOD, by Congress is the responsibility for contract audit policy and oversight. That function permits us to ensure compliance with audit standards and policies. The IG role in this area was reaffirmed by Congress last year. Our oversight reviews of the Defense Contract Audit Agency addressed such subjects as insufficient audit coverage of subcontractors, restrictions on auditor's access to contractor's records, untimely fraud referrals by auditors, and inadequate audit coverage of contractor estimating systems. These reviews have resulted in changes which dramatically improved the effectiveness of DCAA.

The three step process of audit, followup, and policy and oversight has resulted in a very substantial improvement in the effectiveness of internal, as well as contract auditing. When combined with our criminal investigative activity, we can look for systemic ways to improve management of the Defense acquisition process and take immediate and firm actions when fraud or illegal activity occurs.

With regard to the criminal investigative area, my organization dedicated itself to building a highly professional group of white collar crime investigators who could help detect and prevent fraud anywhere in the procurement process. We believe we have done that, and are today pursuing three key areas in procurement—product substitution, cost mischarging/defective pricing, and bribery/kickbacks.

Finally, the IG modified the inspection force inherited from the Defense Logistics Agency that was dedicated only to inspecting Defense Logistics Agency activities on a geographic basis. We have initiated inspections on a functional basis, and recently completed a thorough inspection of the Defense Contract Administration Services, a key component in the day-to-day administration of our contracts. Functional inspections provide a way to look at how a program is accomplished throughout the Department.

The balance of my statement provides what I consider to be the highlights of our activities directed at improving the acquisition process. A more comprehensive statement of our activities is provided to Congress in our semiannual report.

ACQUISITION MANAGEMENT ISSUES

We are actively involved in a number of areas which will directly affect the process by which the Department manages its acquisition process.

Profit Policy. The issue of contractor profits is receiving attention right now. It is our opinion that profit policy legislation in the form of renegotiation boards or continuous profit reviews is not the appropriate way to address this issue.

The Department is concentrating its efforts on improving the way in which it negotiates and administers contracts. Increased emphasis should be placed in the use of the Truth in Negotiations Act and reviews of contractors estimating systems, as well as increasing attention to training, educating, and raising the caliber of procurement personnel. Concentrating too much attention on profits could reduce or penalize innovation because contractors may be prevented from realizing significant monetary benefits from introducing new managerial or technical or production improvements. Inevitably, the focus of profit studies gets around to looking at profit as a percent of costs, sales or investment, and/or a mix thereof. The end result is a tendency to want to sell the Department costs instead of low cost products. For example, a fixed price contract of $30 million with a "cost" of $20 million and profit of $10 million is a much better situation than a contract that provides the same goods or services with a total cost of $35 million, including costs of $30 million and a profit of $5 million. The typical profit study would reach just the opposite conclusion. Profit studies tend to focus only on profits which consist of 10 to 15 percent of a contract. We need to stay focused on all cost elements of a contract including wages and salaries, material markup, effective use of production equipment, overhead, and general and administrative costs.

In summary, we believe that adequate control of contractor profits can be achieved through enhanced competition and better contractor estimating practices. Also, Government negotiation processes that make use of "should cost" techniques, work measurement systems, contractor operational reviews, and more auditing of contracts for defective pricing along with periodic, as opposed to continuous, studies of profit policy will all be useful in ensuring that we pay fair and reasonable prices and reward efficient producers. These techniques can be useful in helping the Department tie its profit policy to contractor's efficiency. I believe that efficient contractors are entitled to higher profits than inefficient ones. Our current negotiation process does not take cognizance of the efficiency factor.

We will, of course, be happy to provide the Subcommittee with our views on any profit policy legislation should it be introduced.

Analyses of DOD Contractor Proposals. Our office is now determining whether reviews of contractor proposals are being effectively conducted at procuring and contract administration offices in accordance with criteria in the Federal Acquisition Regulation. We have examined whether price analysis were effectively used in determining the reasonableness of contractor proposals; the effectiveness of the negotiation process; and the use of audit support in evaluating proposals.

We recently issued a survey report on price analyses of DOD contractor proposals (Report No. 87-108). The objective of the audit was to determine whether pricing reviews were being effectively conducted.

The survey results showed that 42 of the 48 statistically selected procurement actions reviewed contained enough documentation to support the conclusion that sufficient price analyses were performed to ensure price reasonableness. By regulation, price analysis alone can be enough to ensure that the Government paid a fair and reasonable price. Although six contract actions had inadequate or no price analyses, there were no significant indicators to suggest that the Government paid unreasonable prices, and there were no systemic problems requiring corrective action.

This survey report, coupled with the recent spare parts report, shows that DOD is making good progress in reducing the number of unreasonably priced items.

On the other hand, a recent audit on the effectiveness of the negotiation process (Report No. 87-092) showed that improvements are still needed. Our primary objectives was to evaluate whether contracting officers were fully prepared to enter contract negotiations. Our second objective evaluated the adequacy of compliance with the Federal Acquisition Regulation for documenting results of negotiations. We statistically selected and reviewed 175 fixed price contracts, valued at $2.4 billion, at 38 field locations.

We found that contracting officers would have been better prepared for negotiations if more definitive prenegotiation positions were established or if field pricing support had been obtained and incorporated in the prenegotiation objective. Of the 175 contracts reviewed, we found that about 70 percent lacked one or more of the essential documentation requirements. A major concern was the fact that in 87 of 165 contracts where cost or pricing data was submitted, the contracting officers did not include a statement in the Price Negotiation Memorandum that indicated the extent to which he or she relied on the contractors cost or pricing data in negotiating the contract. The "statement of reliance" is one of four essential elements that the Government must establish in defective pricing litigations.

We also evaluated the methods that Government contracting officers are using to resolve costs in a proposal that the Defense Contract Audit Agency has determined to be unsupported (Report No. 87-094). We reviewed the resolution of 58 of the 279 contract audit reports issued during 1984 and 1985 on proposals with $1 million or more of unsupported costs. We found that the resolution of these costs were inadequately controlled and documented in the contract negotiation process. The negotiation of such costs without support results in unnecessary risk of paying unreasonable prices. The Deputy Secretary of Defense has corrected this problem by requiring the contracting officer to document in the files how the unsupported costs were resolved during contract negotiations.

We also found that contracting officers had negotiated five contracts/subcontracts based on proposals that were substantially revised and updated seven or more months after the audited proposals. Four of these contracts/subcontracts were associated with B-1B avionics. The revised proposals were never audited because the auditors were not asked to audit revisions. The total value of these 5 contracts/subcontracts was $1.3 billion. The Federal Acquisition Regulation has been changed to allow the auditors a chance to see revised proposals, by requiring contractors to provide the Administrative Contracting Officers and the audit offices concurrent copies of significant revisions.

Should Cost Evaluations. Should cost evaluations are cost estimates done by the Government and provided to buyers and contracting officers as a tool for use in price negotiations. They consist of an engineering analysis, associated drawings, and detailed reviews of all related cost elements which, together, represent an independent estimate of what an item should cost.

In a report issued in September 1985, we found that when used, should cost analysis was an effective tool in reducing contractors proposed prices. We found, however, there were inadequacies in DOD should cost policy that resulted in underutilization of the should cost concept. The existing policy gave too much latitude to the Military Departments in determining when to use should cost analysis. There was no effective OSD-level monitor to implement should cost policy. Additionally, when should cost analyses were done, they did not sufficiently emphasize key high-cost areas such as overhead and subcontracting. We found that use of should cost could lead to a potential reduction of $6.9 billion over the remaining production life of 10 major programs which had not been subject to a should cost analysis.

We recommended that OSD revise its policy to require that the Military Departments perform at least one should cost analysis early in the production cycle for each major program and better define the conditions that identify the applicability of these pricing techniques. These recommendations were implemented through changes to the Federal Acquisition Regulation and the DOD Supplement. Congress also passed legislation which closely paralleled our should cost audit recommendation. In addition, the Deputy Secretary of Defense directed that each Service perform two should cost reviews of overhead at major contractor operations during calendar year 1986.

Executive Compensation Costs of Defense Contractors. We issued a report on the analysis of salaries and bonuses of executives at 97 randomly selected Governmenmt contractors.

Although there are systems in place to review contractor compensation levels, they have not been working well. In fact, we found that both the Defense Logistics Agency and the Defense Contract Audit Agency perform those reviews. We recommended the review function be transferred from the Defense Logistics Agency, allowing the Defense Contract Audit Agency complete and total responsibility for reviewing contractor compensation costs and programs. We also recommended that controls be established to ensure future compensation reviews are performed consistently and that all contractors meeting the established criteria are subjected to compensation reviews.

The analysis also disclosed that Government contractors, on average, paid their executives 21 percent more in 1980 through 1984 than the average salary and bonus for similar executive positions of similar size non-Defense firms. The major component of the compensation differential was bonuses awarded to Government contractor executives. Furthermore, compensation levels for Defense contractor executives increased at a faster annual rate than levels for private sector executives.

Work Measurement Systems and Engineered Labor Standards. We completed a study on work measurement and engineered labor standards last year in coordination with the Office of the Assistant Secretary of Defense (Acquisition and Logistics). The objectives were to compare commerical and Defense industry usage of work measurement systems and engineered labor standards, determine the effectiveness of Defense usage in contracting and production, evaluate costs and benefits of work measurement, and recommend a DOD-wide policy. The study showed that all contractors studied had work measurement systems, although not all used engineered labor standards, nor did the systems cover all categories of labor. Also, we did not find a single system that was not cost effective. Defense and commerical usage was similar, and Defense and commercial productivity (realization factors) was comparable. We believe that DOD needs to have a policy for dealing with the application of work measurement techniques to all major production contracts. Current practice does not require such application.

Technical Data. The lack of technical data necessary for remanufacturing spare parts has been the major inhibitor to competitive procurement. Some needed data were never acquired; some were bought but not delivered; some were delivered but not usable; and other data were simply missing or mislaid. An interim solution was retrieval of missing information from cooperative Defense contractors. Technical data repositories are to be automated, and the acquisition of technical data is to be considered during new systems development. Breakout may be used as a factor in source selection, and efforts are being made to reduce contractors' proprietary rights in technical data. In 1983, we reported that technical data in DOD possession too often were not being used to solicit competition. Technical data on other items had been procured but were not available for use in competitive buying in the DOD.

A recent Defense-wide review disclosed that contractors for 8 of the 15 systems reviewed did not deliver the technical manuals and data in time for the Services to complete verification before the first delivery of the systems to the field, or to begin in-house maintenance. That resulted in extended and more costly contractor-provided maintenance support, an increase in maintenance downtime, and delayed maintenance training. We concluded that the Services' acquisition process for technical manuals needs improvement to ensure that accurate manuals are delivered and updated at reasonable cost and in time to support in-house maintenance capabilities. This report will be issued in April.

Coverage now being proposed includes a review to determine whether technical data, with limited rights legends, have been reviewed by Defense contracting activities. We also examine whether the propriety of contractor data rights claims have been challenged when the technical data pertain to an item, component, or process developed with Government funds. In the past, contracting activities that procure major systems gave less emphasis to data rights issues than getting the hardware produced. Consequently, we believe there is a high potential for unauthorized markings to be on the technical data delivered to DOD.

The DOD components have carried out 23 of 39 agreed-upon corrective actions recommended in our reports. The others, which include the reissuance of the DOD Directive on managing technical data, should be completed this year.

Training. Another area of importance to efficient management of the procurement process is training the acquisition work force.

Sound procurement policies and procedures alone will not safeguard the taxpayers' money. Program managers, contracting officers, quality assurance inspectors, property managers, and other acquisition personnel must be fully trained. Unfortunately, bureaucracies tend to lose sight of that vital aspect of management, especially when workload is heavy and staffing is short.

Virtually every field review element in my office has reported DOD procurement training deficiencies. In 1982, an audit reported that the Services had yet to implement the basic 1974 DOD directive on career programs for program managers. In 1984, another audit indicated that procurement personnel of all types were not receiving the mandatory training prescribed in DOD regulations. A startling 67 percent sample of almost 1,600 acquisition personnel at 24 activities had not completed the required courses. Reasons given for the neglect included funding shortages, contradictory training policies, overreliance of on-the-job training, and high personnel turnover.

The Assistant Inspector General for Audit Policy and Oversight has identified weaknesses in the training of contract officers. Our audit followup reviews have highlighted the inadequate knowledge of many contracting officers regarding the Truth in Negotiations Act, Cost Accounting Standards violations, and their debt collection responsibilities. Our inspectors have observed training shortfalls for quality assurance and contract administration personnel.

I can report to you that the Department has recognized the need for action in this area and is making progress. The Deputy Secretary of Defense issued two DOD directives with far more teeth than their predecessors. The directives establish prerequisite experience and training for acquisition and quality assurance personnel. Each of the Military Departments and the Defense Logistics Agency have undertaken ambitious, multi-year plans to increase professionalism, reprioritize training, make better use of new training technologies, strengthen the curricula of DOD procurement schools, consolidate formerly fragmented training programs, and earmark resources to eliminate the mandatory training backlog.

We are continuing to track the ongoing DOD corrective actions through our audit followup system. We will periodically review how well the increased DOD commitment is being sustained.

We are considering an audit for fiscal year 1988 that will evaluate the adequacy of criteria and procedures for selecting and appointing contracting officers, and will determine if contracting officers are complying with appointment authority limitation. Another fiscal year 1988 proposed audit will ensure that procurement training is properly funded and executed for the entire Department procurement work force.

IMPACT OF DOD-WIDE AUDIT COVERAGE

Until the establishment of the OIG, DOD, no single audit organization had authority to review simultaneously the procurement activity within DOD or to review contractors' records. That capability has permitted the OIG, DOD, to audit the entire procurement process with emphasis on improving DOD contracting policy and procedures.

Spare Parts. The spare parts reform initiatives that resulted from our early work were a mandate for fundamental changes in the way spare parts are procured. The Secretary of Defense concluded that the acquisition process for spare parts had suffered from a general lack of leadership and attention to detail. The problem had existed for at least 20 years; it was systemic, and could not be solved in a short period of time.

In response to legislative and management initiatives, the Military Departments appointed competition advocates and established reporting mechanisms to record accomplishments. The Army created project "Spare Parts Review Initiative" (SPRINT) and the Navy the "Buy Our Spares Smart" (BOSS) program. The Air Force incorporated its efforts into an existing "Air Force Management Analysis Group" (AFMAG) for spare parts. The Defense Logistics Agency established a management support office for competition, pricing, and spare parts. The original 35 initiatives by the Secretary of Defense, embellished by the SPRINT, BOSS, AFMAG, and Defense Logistics Agency enhancements, exceed 500 spares improvement actions.

At the direction of the Secretary of Defense, the Inspector General, in cooperation with the Military Department audit agencies, completed two Defense-wide audits of noncompetitive spare parts procurements by the Military Departments and the Defense Logistics Agency. The first audit was completed in May 1984, and the second was completed in February 1987. The objectives of the second audit were to determine if unreasonable prices had been paid for spare parts procured through noncompetitive procedures subsequent to the implementation of the initiatives and to compare those results to the first audit report. We also wanted to determine if any unreasonable prices were the result of planned initiatives not being fully implemented. Finally we wanted to address any additional corrective actions needed to improve spare parts procurements.

The audit results showed that implementation of procurement initiatives by the Military Departments and the Defense Logistics Agency has resulted in improvements in the acquisition of spare parts. We concluded that 54 percent of the 655 items sampled in the followup audit were reasonably priced as compared to 35 percent of the 1,724 items sampled in the prior audit. Approximately 28 percent of the sampled items in the followup effort were determined to be unreasonably priced compared to 38 percent in the prior audit. Also, the value of unreasonably priced items decreased from 5.9 percent of the $243 million sampled in the prior audit to 4.3 percent of the $20.9 million in the follow-up. The majority of unreasonable pricing occurred on low-dollar value items (under $1,000) and contracts (under $25,000).

Our office recommended that a policy be established to require that procuring activities record the basis for the price reasonableness determination in their procurement histories. The Department agreed to do so.

Our next effort in the spare parts area will be to conduct a Department-wide audit of spares bought under competitive contracts. We will look at the competitive procurements to make sure that DOD is getting fair and reasonable prices on spare parts when they are purchased competitively. Since far less audit and technical analysis is devoted to competitive purchases. In addition, we want to be sure that spare parts contracts reported as competitively priced are truly competitive. We will also attempt to determine in another audit at what point, for low dollar items, DOD can end up spending more money than it is worth trying to drive the price down or making sure the price is fair and reasonable. In other words, where is the point of diminishing returns.

Contract Pricing of Spare Parts. We are now completing audits of the 95 contractors whose spare parts were found to be overpriced in the first Defense-wide spare parts audit. The purpose of the followup effort is to determine if spare parts contracts with these companies were, in general, overpriced and the reasons for any overpricing. The audits are being performed in cooperation with the Defense Contract Audit Agency (DCAA). The IG audit staff have primary audit responsibility for 58 of the companies, and the Defense Contract Audit Agency has primary audit responsibility for the remaining 37 companies. We recently completed audits of approximately 300 contracts, valued at $3.5 billion, at the 58 companies for which we had primary audit responsibility. Two-thirds of the contracts tested were found to have some defective pricing. The Department is in the process of recovering the $100 million in identified defective pricing.

We are also preparing an overall comprehensive report setting forth the contractor, as well as Government, procurement deficiencies that have led to this overpricing. The overpricing found was primarily attributable to contractors' failure to comply with the Truth in Negotiations Act. As you know the law requires contractors to provide accurate, complete, and current cost or pricing data to the Government negotiators. Several criminal investigations are under way in those instances where the auditors believed the overpricing was intentional. This report will recommend steps that should be taken to minimize future overpricing.

Breakout. Competition has been called the key to fair and reasonable prices; and breakout, the key to competition. About one-third of the Secretary of Defense spare parts initiatives address the breakout functions. That recognizes the large numbers of spare parts bought on a sole source basis from weapon system prime contractors, and the potential savings available through competitive solicitation or by buying directly from the original manufacturer.

In an April 1986 review of negotiated single source procurements using unpriced contractual actions, we found that contracting personnel were not adequately challenging justifications on requested sole source procurements where there was an apparent lack of advance procurement planning or breakout analysis. The report recommended that the Secretaries of the Military Departments and the Director, Defense Logistics Agency, require that advance procurement planning and market research activities be expanded and breakout initiatives be fully implemented. Management undertook 24 specific corrective actions, and had completed 15 of them by mid-1986.

Since 1982, reports have been issued indicating that the breakout of spare parts pricing problems exists in the following systems or programs; F-15, TOW missile optical sights, and P-3C aircraft modifications.

An audit planned for fiscal year 1987 will evaluate the effectiveness of the policies and procedures within the DOD replenishment parts breakout program to ensure that conditions such as prime contractor testing, inspections, quality control and packaging are not impediments to procuring replenishment spare parts directly from the actual manufacturer or competitively. We are proposing coverage during fiscal year 1988 to determine how well the Military Departments are performing component breakout reviews and whether they are aggressively pursuing component breakout on major weapon systems. Another audit will determine if contractors furnishing spare parts are identifying the supplier and sources of the items in accordance with the Defense Procurement Reform Act of 1984 and if Defense procurement activities promptly implement prime contractor recommendations for spare parts breakout.

AUDIT FOLLOWUP SYSTEM

The work of the Department's auditors would be of little value without an aggressive program to ensure that audit findings and recommendations are carefully considered and that agreed-upon audit advice is implemented. The DOD is one of the few Federal agencies in which the Inspector General is the senior audit followup official, and that close involvement has been invaluable. By pursuing full implementation of audit recommendations, the Inspector General is able to ensure that overall DOD policies are revised in a way to incorporate lessons learned from audit coverage, especially in the procurement area.

Prior to 1981, recommendations by DOD internal and contract auditors were often not fully implemented by DOD managers and contracting officers. When audit findings or recommendations were disputed, the decision regarding whether or not the audit advice would be implemented was often never explicitly resolved. Management responses to both the General Accounting Office and DOD internal audit offices were often unnecessarily negative or too vague for anyone to determine whether corrective action would be taken. No effective DOD system existed for tracking the status of agreed-upon actions or for ensuring that findings reported by auditors had actually been addressed.

The problems have been vigorously addressed through the creation of audit followup systems. The IG, DOD, has performed followup on over 9,300 agreed-upon IG, DOD, and the General Accounting Office suggestions for savings and management improvements and has documented the achievement of $11.1 billion in savings and cost avoidance. The bulk of the monetary benefits pertain to the procurement area.

The DOD has also made considerable progress in improving contracting officers' sustention rates on costs questioned by contract auditors. During the 6 month reporting period ending September 30, 1986, the Military Services achieved a record high sustention rate of 72 percent on significant post award audits. We attribute the improved cooperation between the Defense Contract Audit Agency and contracting activities to various factors, with the contract audit followup effort playing a key role. We report contract audit results to Congress in considerable detail in our semiannual reports.

I want to underscore the importance placed on contract audit followup as a crucial ingredient in maximizing the benefit of contract audit advice and in maintaining a disciplined, effective procurement system. Contract audit folloup was vigorously opposed by virtually every DOD procurement component when Office of Management and Budget first levied the the requirement on the Department. In fact, without prodding from the Congress we might never have put any system into place. Even the contract auditors were somewhat unsure of what the ramifications would be.

In five years the program has proved its worth. One by one, the initial concerns have been dispelled. Contracting officers' authority has not been destroyed. Auditors are not running the procurement process. Every audit report is not becoming a protracted confrontation.

Instead, the program has ensured that (1) the status of every audit report is known, (2) contracting officers do address all audit recommendations, (3) their decisions are a matter of record, (4) significant, disputed recommendations are referred to a higher level procurement official for review, (5) there is emphasis on closing out reports promptly, (6) auditors get explicit feedback on the impact and usefulness of their reports and (7) higher management levels have access to data concerning the effectiveness of the auditor/contracting officer interface at any given location. No meaningful estimate can be made of the dollars saved due to the program's success, but I am convinced they are very substantial and I solicit the committee's continued strong support of our audit followup efforts.

FRAUD IN PROCUREMENT

Criminal Investigations. The Department of Defense, in partnership with the Department of Justice, has aggressively pursued prosecutions of procurement and corruption cases. Since 1983 more than 325 criminal convictions and civil judgments have been entered in Federal court by OIG criminal investigators. As a result, recoveries of over $111 million have been realized. The total Department of Justice-related recoveries, fines, and forfeitures from criminal investigations, including those *other than* procurement and corruption, during the past three years amount to more than $134 million. In addition, proactive efforts and initiative investigations to root out corruption have been a top priority of the Department.

Cost Mischarging/Defective Pricing. Investigation of cost mischarging and defective pricing by contractors is a top priority of our agents. Those cases represent two of the most common and serious abuses found in public contracts. They are also among the most complex investigations, with a myriad of cost allocation systems and procedures to be untangled, and need expert audit assistance. The importance of those investigations demands that level of attention. Not only do those schemes corrupt our buying process, but the impact is always greater than the actual dollars misallocated or overpriced. For example, when direct labor costs are overcharged, so are the associated overhead and general and administrative expenses. Since those additional costs usually exceed 100 percent of the labor costs, such mischarging ultimately results in greater than double loss to the Government. Currently, we have an inventory of 156 cost mischarging and 96 defective pricing investigations.

Product Substitution. An area of continuing concern is that of product substitution. Our investigators are currently involved in several hundred such cases wherein contractors have intentionally furnished products to DOD which are known to be defective or otherwise failed to meet Government specifications. During this past year, 46 criminal prosecutions of such contractors have been successfully completed.

Bribery, Kickbacks, and Corruption. Recent months have witnessed the successful investigation by my office and the Federal Bureau of Investigation of more than 36 individuals, relating to bribery, kickbacks, and corruption. In California, Operation DEFCON, and acronym for "Defense Contractors," resulted in 16 indictments relating to widespread, systemic payments of kickbacks from subcontractors to DOD prime contractors. In Philadelphia, a total of 15 individuals and corporations were indicted recently as the result of a lengthy and far-reaching investigation involving the payment of bribes to Defense Logistics Agency officials at the Defense Personnel Support Center by clothing contractors. In this instance, the second highest ranking civilian employee was charged in the criminal indictment. As always, we recognize that the vast majority of DOD contractors, as well as our employees, are honest, hardworking people, but where there are indications of corruption, we are determined to expose the individuals involved and restore integrity to the contracting process.

We have a number of projects proposed for fiscal year 1988 regarding clothing and textile programs. My inspectors will perform a general inspection of the clothing and textile office at the Defense Personnel Support Center to determine, among other things, if any material control weakness exists in the process by which the Department buys military clothing. At the same time, auditors will determine whether procurements of clothing and textiles are being made in accordance with policies and procedures of the Federal Acquisition Regulation. These reviews will incorporate lessons learned from the recent criminal indictments in the clothing industry.

Suspension and Debarment. We can look to other indicators of a successful antifraud program in the Department of Defense. Since fiscal year 1981, suspensions and debarments of contractors have increased from 151 5o 885 in fiscal year 1986. Those and other administrative actions, based on Department of Defense investigations, ensure that unscrupulous contractors are either denied further business or forced to restructure their operations, often include the dismissal of senior company officials who have been caught cheating. Settlement agreements reached with suspended contractors demonstrate conclusively that the suspension and debarment process protects the Government and encourages meaningful and enforceable standards of conduct in companies that previously lacked them.

Voluntary Disclosure Initiative. As the Department pursued defective pricing and cost mischarging audits of Defense contractors, we realized that the magnitude of the problem could overwhelm our resources. We, therefore, initiated a voluntary disclosure program for Defense contractors. The program, which is in part a response to the Defense Industry Initiative and Packard Commission Report, supports the concepts of enhanced contractor self-policing and reporting of significant fraud and mismanagement problems.

Since DOD encouraged the program, 24 disclosures have been made to the OIG, DOD. The disclosures involved a total of 16 contractors, 11 of which are Top 100 Defense contractors.

Significantly, both the DOD and DOJ have acknowledged that the program offers clear incentives to corporations seeking to avoid criminal prosecution and debarment. In fact, in a recent letter to the Deputy Secretary of Defense on the prosecutive guidelines for contractors who self-disclose wrongdoing, the Deputy Attorney General stated that "Contractors that make serious and responsible efforts to comply with the law and promptly disclose misconduct should not be discouraged from those practices by inflexible prosecution policies. In some self-disclosure situations, criminal prosecution of the self-disclosing contractor could undermine our law enforcement objectives and would, therefore, be in appropriate."

Whistleblower Protection. In your letter inviting me to appear at these hearings, you asked me to discuss whistleblowers. Let me say at the outset that we in the Office of the Inspector General rely on unsolicited reports of fraud, waste, and mismanagement. We have a Hotline that receives more than 1,000 calls a month. While many of the calls do not result in good leads, a substantial number do alert us to facts which deserve further investigation. Also, many of the calls give DOD managers early indication of trouble and poor morale in the workplace that they can correct.

Unfortunately some of those who use the Hotline or make disclosures of wrongdoing may be the subject of some form of retaliatory action at work. We in the IG office abhor such treatment and make an alleged retaliation the subject of investigation. We will fully utilize the recently enacted provisions of the Defense Acquisition Improvement Act of 1986 to protect contractor employees from reprisals for disclosing to us information relating to a substantial violation of law involving a Defense contract.

It should be noted that Section 7 of the Inspector General Act prohibits action taken in reprisal for making a complaint or disclosing information to the Inspector General. It should also be noted that members of the Armed Forces are deemed employees of the Department of Defense for the purpose of benefiting from protection against such reprisals.

Employees of Government contractors who disclose contractor wrongdoing to the Government, assist in an investigation, or initiate a *qui tam* suit against the Government have also been given additional protections against adverse personnel actions through Section 4 of the recently enacted False Claims Amendments Act of 1986.

It is too early to know how the courts will interpret these laws. However, Congress has shown that it intends to provide protection for those who are courageous enough to report wrong-doing and who are punished for speaking out.

INSPECTION CAPABILITY

The OIG, DOD, performs organizational and functional inspections which are broad in scope and seek to identify systematic and management problems. Our inspection capability evolved from the congressional transfer of the IG element of the Defense Logistics Agency to the IG, DOD. The inspection process was strengthened and refocused toward essential policy decisions governing DOD as a whole, in particular, inspecting management of entire Defense agencies or functions. Our functional inspections provide the Secretary and Deputy Secretary of Defense, the Assistant Secretaries of Defense, and the Directors of the Defense agencies a balanced look at the effectiveness of an entire functional area across organizational boundaries.

We identified and began to cover over 165 activities that had not had inspection coverage from any of the Military Department Inspectors General. The most significant inspections involved the DOD Dependends Schools, the Civilian Health and Medical Program of the Uniformed Services, the Defense Communications Agency, the Defense Investigative Service, and the management of hazardous waste/hazardous material.

Our inspections continue to provide service to management by pinpointing problems and recommending solutions. For example, the OIG, DOD, recently completed an inspection of Contract Administration Services that identified widespread weaknesses. The weaknesses included conflicts and confusion between the Contract Administration Services and other elements of the procurement community over respective roles and authority, a lack of timely contract audit support, overlapping reviews of contractors, high personnel turnover, and shortages and inequities in staffing. We are working closely with management to assist in preparing "get-well" plans for the problems identified.

WORKING WITH CONGRESS FOR PERMANENT IMPROVEMENT IN THE ACQUISITION PROCESS

The OIG, DOD, has also been active in testifying at congressional hearings and working with committee staff to explain the need for amendments to existing laws and enactment of new legislation to improve the procurement process and assist in fighting fraud. During the 99th Congress, we appeared at more than 15 hearings involving oversight of the management of Defense programs or pending legislation. Some examples of laws which we supported were:

Amendments to the Truth in Negotiations Act that preclude contractors from claiming as defenses in defective pricing cases the lack of knowledge of certain facts or lack of reliance on cost or pricing data by the Government.

The Program Fraud Civil Remedies Act that imposes civil remedies on contractors who defraud the Government but who are not prosecuted by the Department of Justice.

Amendments to the False Claims Act that increases civil penalties for false claims, allow recovery for consequential damages, and increases the Government's ability to investigate false claims cases.

Revisions to the Anti-Kickback Act that increase criminal and civil penalties, allow administrative offsets, and expand coverage.

Competition in Contracting Act of 1984. In your invitation you also asked that the Competition in Contracting Act be address and what the Inspector General has done as a result of the legislation. The act is relatively new and we are pleased with its provisions. We have four audits in process and three audits under consideration for late fiscal year 1987 and fiscal year 1988 that will specifically cover areas related to the Competition in Contracting Act. They are as follows:

ONGOING AUDITS

DOD Competition Advocacy Program. The objective of the audit is to evaluate the implementation of the program and its impact on competitive procurement practices within DOD.

Our survey showed that DOD has made progress in staffing the offices of the competition advocates. However, there is no reliable data to determine the effectiveness of the program. The DOD determined that the increased competition rates being reported show the effectiveness of the competition advocacy program. We concluded, that the reported increase in competition cannot be totally attributed to the competition advocate. It is influenced by other factors, such as changes in legislation and regulation and subjective definitions of competition. We also found that the competition advocates in some of the major buying commands were not independent of the contracting office and that they were not always allowed to perform their mission on a full time basis. Both those conditions are inconsistent with the requirements of the Competition in Contracting Act.

Justification for Sole Source Procurements Resulting From Unsolicited Proposals. The objectives of that audit are to evaluate the need for items purchased as a result of unsolicited proposals and to determine whether proper procurement procedures were followed in the acquisition of the items. Work has just started on the review.

Vendor Technical Qualification Process for Aircraft Engine Spare Parts Procured by the Naval Aviation Supply Office. This audit was initiated in response to DOD Hotline complaints alleging that the technical approval process for aircraft engine spare parts procured by the Aviation Supply Office has been untimely and restricted competition. The primary objective of the audit is to evaluate the process and determine the validity of the allegation and the impact of any delays on competition.

Dual Sourcing and Split Award Procurement Techniques. The primary objective of the audit is to determine the adequacy of DOD policy and its implementation concerning dual-sourcing and split award procurement techniques. We will also determine whether dual-sourcing procedures are achieving increased competition leading to greater economies and efficiencies in the procurement process.

Although we have not issued an audit report, our efforts to date show that decisions to introduce competition, via dual sourcing, into major acquisition programs are not always well supported. The Services do not have adequate guidance nor are they performing effective analysis for the decision. We also found that the techniques used to split the requirement between two contractors can be conducive to contract overpricing. We have also quantified some positive benefits from dual sourcing. This is a very complex and large audit effort, and we are several months away from issuing a final report.

PROPOSED AUDITS

Emergency/Urgent Procurement Requirements. The audit objective will be to evaluate the appropriateness of acquisition methods and contract types to procure emergency/urgent procurement requirements and determine if the public exigency exception code is only cited by contracting officials when warranted.

DOD Acquisition Source Restrictions to Maintain an Industrial Mobilization Capability. The audit will determine whether the noncompetitive or limited competitive procurement of items on the FAR Supplement 25.7405 Exclusion List is appropriate. Specific objectives will be to evaluate the basis for adding and maintaining items on the DOD FAR Supplement 25.7405 Exclusion List; determine whether procurements made under Title 10 U.S.C. 2304(c)(3) are limited to items on the Exclusion List; evaluate actions taken by DOD to increase the number of qualified sources for mobilization base items; identify the costs, if any, of restricting competition for items on the Exclusion List; determine the feasibility of limiting mobilization base items to critical items or components; and determine whether domestic sources will be available to manufacture critical military items which require greatly increased production during wartime.

Validity of Competition Statistics Being Reported by DOD. The objectives of the audit are to determine the validity of competition statistics and cost savings being accumulated and reported by DOD. The audit will also determine whether the method DOD uses to report competition statistics meets the criteria set forth in Part 6 of the Federal Acquisition Regulation.

In addition, various other projects that are ongoing, planned, or being researched by our office may address issues that are indirectly related to areas affected by the Competition in Contracting Act.

TWO ISSUES OF CONCERN OF THE INSPECTOR GENERAL

I will take a few minutes to discuss some of the issues which are important to the office and have yet to be completely resolved.

Truth in Negotiations Act. The Act was amended in 1986, and the amendments should be of substantial benefit to the Department when negotiating contracts. One of the amendments was to define "cost or pricing" data. The definition should protect the Government and its contractors.

However, in discussion of the definition of "cost of pricing data" the conferees used an unfortunate example to describe what information is judgmental in nature and not required to be disclosed to the Government. We believe that some form of clarifying statement would be in order to avoid unintended application of the explanation by a court or the Board of Contract Appeals and to avoid confusion on the part of contracting officials.

I would be happy to have my staff work with staff of the Subcommittee to remove the confusion.

Oversight of Defense Contractors. One of the problem areas identified by the Packard Commission was that of duplicative oversight of contractors by Defense activities. The issue was addressed in the Defense Acquisition Improvement Act of 1986. Specifically the Act provided that the Under Secretary of Defense for Acquisition would be responsible for prescribing "policies to ensure that audit and oversight of contractor activities are coordinated and carried out in a manner to prevent duplication by different elements of the Department." The Act further provided that in carrying out the responsibility "the Under Secretary shall consult with the Inspector General of the Department of Defense."

We are pleased with the provision in the Defense Acquisition Improvement Act of 1986 since the responsibility for formulating audit policy remains with the Inspector General. We will actively support all efforts by the Under Secretary of Defense for Acquisition to develop effective long-term solutions to the problem of duplicate oversight of contractor operations. Unfortunately members of the contracting community would like to see our contract oversight and policy functions diminished. We will keep the Subcommittee apprised of any problems we encounter in this area.

In early 1985, the attention of the Armed Services Committee was called to the problem during testimony before the Subcommittee on Defense Acquisition Policy when officials from Defense contractors and industry associations expressed concern over the duplicative and excessive auditing of Defense procurement programs. Two of the witnesses were the Chairman of Lockheed and Martin Marietta. The Inspector General directed his staff to investigate the matter, and based on a survey of audits conducted at Lockheed and Martin Marietta, no evidence was found of duplicative or excessive audit coverage.

Subsequent discussions with the Chairmen of Lockheed and Martin Marietta disclosed their real concern dealt with all DOD visitors to their facilities, not just auditors. Accordingly, the Inspector General expanded his review to cover all oversight activities at selected Lockheed and Martin Marietta facilities. The expanded review did disclose evidence of duplicative oversight coverage.

A review of 25 cases identified by the contractors disclosed that evidence of duplication was present in 14 of those cases. The 14 cases involved 13 DOD audit, contract administration, and procurement organizations, the General Accounting Office, and a prime contractor. We identified four problem areas that were contributing factors to the duplicative reviews and which appeared to be of a systemic nature, including:

1. Poor advance planning and coordination;

2. Lack of clear definition of responsibilities of various oversight organizations;
3. Reluctance to place reliance on the work of other oversight organizations; and
4. Inadequate controls over the access to contractors' records by external oversight organizations.

Subsequently, the certified public accounting firm of Arthur Anderson and Company conducted a similar but more comprehensive review of that area for the Packard Commisson. Arthur Anderson found the same systemic problems. One of the Packard Commission reports stated that "It is noteworthy that Arthur Anderson and the OIG found identical problems of a systemic nature among DOD contractor oversight organizations." The report issued by Arthur Anderson concluded that duplication in the oversight process was extensive and that changes were clearly required to enhance the efficiency and reduce costs to both the contractors and the Government.

While the reviews by the Inspector General and Arthur Anderson arrived at identical conclusions as to the causes, the Packard Commission recommended a different solution to the problem. The Packard Commission solution to the problem was to have the Under Secretary of Defense for Acquisition exercise control over all contract audit policy issues. Such responsibilities were and continue to be assigned to the Inspector General by the Congress. The Packard Commission report did not identify any audit policies issued by the Inspector General that contributed to the problem of duplicative oversight coverage.

On the contrary, policies issued by the Inspector General have been specifically designed to minimize duplication in the audit process. For example, DOD Directive 7600.2, entitled "Audit Policies," provides that ". . . DOD internal audit and internal review organizations shall coordinate all reviews involving contractor records with the DCAA and the appropriate contract administration office to avoid duplication of audit work." The Directive further provides that DOD audit organizations also shall coordinate and cooperate with other DOD investigation, inspection and management groups to avoid duplication and to ensure effective oversight coverage of DOD programs and operations.

Incorrect information by industry representatives has focused attention on auditors as the culprits in duplicative oversight issue. That was because industry labeled all Defense visitors to contractors' facilities as "auditors." In reality, only a small percent of such visitors are Defense auditors. Most of the visitors are from Defense procurement, test or contract administration organizations. For example, we reviewed a register of DOD visitors scheduled to visit a major Defense contractors. The register contained about 1,900 names and not one of the listed individuals was a Defense auditor. Moreover, we recently completed an inspection of the Defense Contract Administration Service and found evidence of duplicative oversight coverage. The duplication was between representatives of the Defense Contract Administration Service and the Military Departments.

Mr. Chairman, that concludes my statement. As I indicated earlier, the IG, DOD, has a firm commitment to improving the Defense acquisition process. We will continue to subject Defense programs to the utmost scrutiny, aggressive followup on our recommendations, provide policy and oversight to the Department auditors and protect the Department resources from illegal activity. We recognize the need to work closely within the Department and with the Congress to accomplish that end.

I will be happy to answer any questions you have.

Senator **Bingaman**. Thank you very much. We appreciate it. Mr. Conahan.

STATEMENT OF FRANK C. CONAHAN, ASSISTANT COMPTROLLER GENERAL, NATIONAL SECURITY AND INTERNATIONAL AFFAIRS DIVISION

Mr. **Conahan**. Thank you, Mr. Chairman.

I too have a rather extensive statement which I would like to submit for the record. Just working from it, perhaps I can go through it very quickly.

I had intended to comment on five specific initiatives undertaken either at the initiative of the Department of Defense or the Congress over the past several years.

These related to competition in contracting, the work force, testing, warranties and pricing policy.

Perhaps if I could just say a word or two about each then we could get into questions.

Before I do that, let me say that I think the Department of Defense generally has done a good job in implementing all of these initiatives, but there is room for improvement.

With respect to the Competition in Contracting Act, we did point to the Department of Defense in a number of areas where we felt that the FAR and the DAR supplement needed to be revised in order to be more consistent with that act. A number of actions have taken place. We think that there are a number of divergences between the intent of the Congress and the current FAR and DAR.

Our open recommendations are with the Department of Defense and other agencies with respect to those, hopefully we will see some action on them as time goes by.

An extensive body of work completed by us 1 year ago had to do with improving the procurement work force. We felt that there needed to be a much better definition on the roles and responsibilities of the major actors in that regard. We felt that there needed to be better education and training. We felt that someone needed to come to grips with the external influences on that process, and some other criteria needed to be better defined.

I think the DOD has begun to move in that area. We see extensive and better training and education for the people. We see better assignment of people. We have seen responses to the DOD initiatives enacted by the Congress in terms of the qualification of program managers and deputy program managers, and so on. So I think that the steps that have been taken are a move in the right direction. Again, as I say, some further steps can be taken.

On operational tests and evaluation, I think that Senator Pryor synopsized our recent report as well as one could. I don't need to say much more about that.

I would however like to just add that we did another report recently with respect to testing and evaluation, and it points out that there are a number of things that we think that we need to focus in on. Some of which Mr. Krings touched on.

They are in the statement and we commented on them, but I would just like to point to them. We think that OT&E plans objectives or criteria are often inadequate. I think Mr. Krings mentioned that. Test resources are limited, and at times simply not available. And this is not a new condition. We have been talking about this for quite some time. Mr. Krings talked about his budgetary needs to do some more testing.

We also think that the realism of testing needs to be looked at. Decisions to produce new systems are often premature. I think Mr. Krings agrees with that. Then, the OT&E results as reported are simply inadequate as far as we are concerned.

We have completed a body of work with respect to warranties. There are a number of things that we felt needed to be done. There were a number of legislative initiatives in that regard. We think the DOD has generally complied with requiring warranty provisions in the contracts that it has executed since that time, but there are a number of implementation problems that exist. We can talk to that as we chose.

The last area that I wanted to talk about had to do with pricing policies. Most of the pricing considerations in the Department of Defense emanate from the horror stories of 1982 and 1983. There were pricing initiatives generally, and then there were pricing initiatives with respect to spare parts.

I think that in both respects there has been a lot of movement, but I think in both respects there also needs to be much further work done in order to get us where we need to be in those particular areas.

A word on profit policy. There is an interim policy, as was testified to earlier today. There was reference to a GAO proposal for a contractor profitability system, legislation has been introduced in both the House and the Senate at this point calling for a contractor profitability system. I am prepared to answer any questions that you may have on that.

[The prepared statement of Frank C. Conahan follows:]

PREPARED STATEMENT OF FRANK C. CONAHAN, ASSISTANT COMPTROLLER GENERAL, NATIONAL SECURITY AND INTERNATIONAL AFFAIRS DIVISION

Mr. Chairman and members of the subcommittee: It is a pleasure to be here today to discuss recent changes in DOD procurement policy initiated by the Congress and the Department of Defense.

Principal among the DOD initiatives are the Defense Acquisition Improvement Program, also known as the "Carlucci Initiatives", and the separately administered Spare Parts Pricing Initiatives. Subsequently, the Packard Commission recommended further organizational reforms and procurement policy changes.

Legislation, attempting to deal with procurement problems, enacted since 1984 include: the Competition in Contracting Act of 1984, the Defense Procurement Reform Act of 1984, the Defense Procurement Improvement Act of 1985, the Defense Acquisition Improvement Act of 1986, and the Department of Defense Reorganization Act of 1986.

All of these actions result from a continuing concern that DOD could and should do a better job in managing itself. As should be expected with so much happening in such a relatively short period of time, there is probably some convergence of individual initiatives.

We have not made a comprehensive evaluation of how all the initiatives have been implemented, but over the past few years we have reviewed many of them. The one exception relates to DOD reorganization—an evaluation of which we have deferred to give DOD time to implement the changes.

OBSERVATIONS ON IMPLEMENTATION OF THE INITIATIVES

In general, DOD has done a good job implementing the initiatives even though there is still room for improvement. For the next few minutes, I would like to discuss our observations in five specific areas: competition in contracting, work force, testing, warranties and pricing policy.

COMPETITION IN CONTRACTING

As you know, the Competition in Contracting Act of 1984 (CICA) substantially revised the fundamental legislative structure for defense procurement that had been in place for almost forty years. Among other things, it requires full and open competition, which allows all sources capable of meeting the government's needs to compete, except in seven specified circumstances. Shortly after enactment, GAO began to monitor the extensive regulatory changes that were being developed to effect implementation of this law.[1]

We reported that some Federal Acquisition Regulation (FAR) provisions needed to be revised to be consistent with the act or with congressional intent as expressed in the conference committee's report. Many of our recommended changes were subsequently adopted and took effect in 1986. However, corrective action has not been taken on some of our recommendations. As a result FAR is at variance with the intent of Congress in several respects. For example, FAR permits written justifications under six (of the seven) exceptions to the requirement for full and open competition to be made for a class of contract awards, rather than on a case-by-case basis, contrary to the conference report. Overall, however, the many FAR revisions adopted generally reflect the statute.

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[1] Federal Regulations Need to be Revised to Fully Realize the Purposes of the Competition in Contracting Act of 1984 (GAO/OGC-14) August 21, 1985.

We are currently evaluating compliance with CICA at seven procurement activities.

We are reviewing two random samples of contracts to determine whether (1) written justifications for agency officials' decisions not to provide for full and open competition met requirements, including whether these decisions were appropriate, (2) full and open competition was use, as was reported in cases where only one offer was submitted to the government. in both contract samples we are also determining whether requirements for public notices of proposed awards were met.

IMPROVING THE PROCUREMENT WORK FORCE

We cannot overemphasize the need to attract and retain quality personnel if we are to have a sound procurement system. As a step in this direction, the Defense Procurement Reform Act of 1984 requires that military officers assigned as managers of major acquisition programs serve a minimum 4-year tour of duty in that capacity. In addition, the Defense Procurement Improvement Act of 1985 requires that those managers possess at least 8 years of experience in acquisition management before they are appointed and that at least 2 of those years be while assigned to a procurement command. The Defense Acquisition Improvement Act of 1986 directs that DOD develop plans to enhance the professionalism of, and career opportunities available to, acquisition personnel in the Department as well as a plan for coordination of defense acquisition educational programs.

Last year we concluded a comprehensive evaluation of procurement workforce issues. We found that the capabilities of program managers and contracting officers are not what they should be. More specifically, the roles of those officials are not fully defined nor well understood; acquisition strategy development lacks criteria to tailor the extent of competition to individual programs; external factors affecting many programs create a poor climate for logical, planned program development; and career programs do not provide the broad experience, training, qualification criteria, nor needed incentives to assure sufficient competence.

Subsequent to the issuance of our report we noted a number of responsive actions on the part of DOD. To comply with the Acts DOD now requires program managers to have at least 8 years of experience and be in a program manager position at least 4 years. In addition, DOD directives were revised to require that military and civilian deputy program managers of major acquisition programs have at least 3 years of relevant experience with one year at a procurement command. In addition these individuals should have degrees in technical, scientific managerial fields. DOD now also mandates training, education, and experience levels for contracting, quality assurance, property administration, procurement and industrial specialists, as well as business and financial management personnel assigned to the program offices. Such steps begin to address the problems we observed.

OPERATIONAL TEST AND EVALUATION

In September, 1984, Congress established in DOD the Director of Operational Test and Evaluation to ensure that Operational Test and Evaluation (OT&E) would receive appropriate emphasis and independent oversight in the acquisition of new weapon systems. The director, a civilian, is the principal advisor to the Secretary of Defense for OT&E matters, and he reports to the Congress on the adequacy of operational testing and the question of whether a particular system will be operationally effective and suitable for combat.

Adequate testing and evaluation of weapon systems has long been a major concern of GAO and the Congress. We recently issued a report identifying the director's contributions to DOD OT&E activities and areas where he needs to place further emphasis to function as a fully reliable, independent oversight official.[2] Our report shows that he made particularly noteworthy contributions in the test planning area. His office has been responsible for improving test and evaluation master plans and has participated in revising the primary DOD directive on test and evaluation, including supplemental test planning guidelines. However, there were several areas where oversight effectiveness could be improved. More specifically, the director's office should be making more onsite observations of operational tests, using test results as the basis for analysis rather than test reports prepared by the military services, providing uniform policy and procedural guidance and maintaining more reliable records of its principal activities. The director's office acknowledged these shortfalls and attributed them to staff limitations.

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[2] Operational Test and Evaluation Oversight: Improving But More is Needed (GAO/NSIAD-87-108BR, March 18, 1987).

While progress has been made more must be done. In another recent report,[3] we identify the following as the areas of principal concern: (a) OT&E plans, objectives or criteria, are often inadequate, (b) test resources are limited and, at times, simply not available, (c) testing is often not realistic, (d) decisions to produce new systems are often premature, and (e) OT&E results as reported are sometimes inadequate.

WARRANTIES

Another quality issue is being addressed by the warranty legislation. Because weapon systems often fail to meet their military missions, are operationally unreliable, have defective and shoddy workmanship, and can imperil the lives of U.S. troops, Congress passed legislation requiring that DOD obtain warranties in its weapon system production contracts. The belief was that warranties would make contractors more accountable and encourage them to build more quality and reliability into their systems.

Warranties are not required on items that are not weapon systems, such as spare parts, and items not used to carry out combat missions.

We found that DOD has generally complied with the warranty legislation but some implementation problems exist. For example,

The services obtained many warranties without performing appropriate cost-effectiveness analyses.

Most warranties did not identify the performance requirements which would be assessed during the warranty period or identify how and when performance would be assessed.

Many warranties did not explicitly state whether the contractor was responsible for redesign if performance requirements were not met.

We believe that DOD is taking the necessary steps to rectify these concerns.

PRICING POLICIES

The last area I would like to address is pricing policy. Much if not all of the recent emphasis on pricing emanated from the spare parts horror stories. There are many subjects which comprise this area, such as, spare parts pricing, contract pricing including defective pricing, cost principles, unpriced contracts and profit policy. I will limit my discussion to spare parts pricing, contract pricing and cost principles.

Extensive amounts of legislation along with management attention at all levels within DOD have been aimed at addressing concerns over spare parts pricing. Before initiation of corrective actions by DOD in 1983, in its efforts to meet productivity goals and to minimize the amount of resources expended in anaylzing low dollar value contracts, our work showed that DOD was performing inadequate price analysis on procurement with severe price growth. We estimate that DOD did not obtain adequate justification for the significant increases on 44.5 percent of the contracts with price increases of 25 percent or more. The Defense Procurement Reform Act of 1984 set forth specific actions that are to be taken by DOD to improve the pricing of spare parts.

Within DOD, the Army, Navy, Air Force, and Defense Logistics Agency now have comprehensive programs consisting of a large number of initiatives. Although early in the implementation phase, we evaluated the impact that these initiatives were having on the growth of spare parts prices and the adequacy of price analysis, and found that conditions have improved. For example, in our earlier report, we found that 15.6 percent of procurements at one Air Force buying activity experienced price growth of 25 percent or more. In our most recent effort, it was 6.5 percent. In addition, in our previous work, this Air Force activity did not obtain adequate justification for significant price growth in about 44 percent of the cases, while subsequent to the initiatives, this figure was reduced to 35 percent. While this effort provides reasons for optimism, ample opportunity exists for further improvement.

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[3] Operational Test and Evaulation can Contribute More to Decisionmaking (GAO/NSIAD-87-57, December 23, 1986).

Three years ago, GAO initiated an extensive effort to look at systemic contract pricing issues as well as specific defective pricing cases. The top five issues which we identified and are pursuing are: subcontractor pricing, cost estimating, unpriced contracts, technical evaluations, and overhead-forward pricing rate agreements.

We have performed work on the first three issues and are now initiating work on technical evaluatioins and forward pricing rate agreements. Our work to date has disclosed a number of problems and raised concerns about whether DOD contracting officers are negotiating fair and reasonable contract prices. For example:

Our review of a sample of major subcontracts disclosed that safeguards intended to insure fair and reasonable prices were not effectively implemented. Prime contractors were able to achieve subcontract prices reductions of $42 million below the amounts negotiated with the government in the contracts we reviewed. We believe that price reductions occurred in large part because DOD contracting officers did not require contractors to either obtain subcontract cost or pricing data, to evaluate the data, or to provide the results of their evaluations before prime contract negotiations. Instead, DOD contracting officers used alternative pricing techniques that were not as effective as subcontract evaluations to establish the reasonableness of subcontract estimates included in prime contract prices.

Our work on subcontract pricing also disclosed several defective pricing cases. We have in-process or issued 13 reports with potential recovery value for the government of $28 million. This work demonstrates the difficulty in enforcing the Truth In Negotiations Act. We found many cases where contractors had more accurate, complete, and current data which indicated lower prices than those proposed to the government.

We found that the DOD program for surveillance of contractors' cost estimating systems has not been effective. The program suffers from a lack of (1) criteria for judging an acceptable estimating system, (2) clear direction and responsibility for resolving deficiencies, and (3) management emphasis at all levels, including the Defense Contract Audit Agency (DCAA), which is responsible for the program. Nine of the 10 contractors we visited had unresolved estimating deficiencies. The DCAA also identified 72 contractors where significant estimating deficiencies were unresolved at the end of 1984. Deficiencies at 21 of the 72 contractors had been outstanding for over 2 years.

The message is clear. DOD had become too complacent and changes were necessary.

Concerning unpriced orders, we found that the process in place were not being adhered to and that, in many instances, contracts remained unpriced well beyond the required 180 days. As of September 30, 1985, DOD's use of unpriced contracts was at its highest value ever—about $28 billion.

The Congress and DOD have taken actions to control the use of unpriced contracts. The Defense Acquisition Improvement Act of 1986 placed a number of restrictions on unpriced contracts including approvals by the agency head, limits on the amount of obligations, and restrictions on their use and the amount of profit contractors can earn on them. In turn, DOD has taken several actions and as a result, as of September 30, 1986, DOD's unpriced contracts totaled $16.4 billion—an $11.5 billion reduction from the end of previous year. Even though we see the number and value of unpriced contacts decreasing, more progress can be made. At this time, we do not see any need for additional legislation or regulations, rather we see a need to enforce and abide by the processes in place.

You may recall the Defense Procurement Improvement Act of 1985 directed DOD to amend its regulations covering the types of costs incurred by contractors that are allowable or reimbursable under defense contracts. These regulations are commonly known as cost principles. The law calls for 10 specific types of costs to be considered unallowable, and DOD was to define in detail and specific terms which of 16 other types were unallowable. The law also required DOD to amend the regulations governing resoltuion of questioned costs. By the deadline established in the law, DOD had made most of the prescribed changes.

The changes affected 13 of DOD's 51 cost principles, such as cost of alcoholic beverages, contributions and donations, and advertising and public relations. Some changes were notable because the cost principles were either rewritten or a new concept for determining allowability was added. For example the advertising principle was expanded to include public relations costs. This principle contains (1) definitions for the two terms, (2) identification of the specific types of advertising and public relations costs which are allowable, (3) a declaration that all other advertising costs are unallowable, and (4) a list of numerous public relations costs that are unallowable. In addition DOD added a new and important concept to this principle:

a declaration that costs which are unallowable under this principle cannot be allowable under any other principle and vice versa.

The full effect of the regulatory changes will not be known for several years because they apply only to contracts resulting from solicitations which were issued after April 6, 1986.

We believe that the cost principles cannot be written in such a way as to remove all ambiguity. However, we also think that the contractor, contracting officer and contract auditor would benefit if certain additional changes were to be made in two cost principles. We have recommended to the Secretary of Defense that the reference in the entertainment principle to other cost principles be removed and that a statement be inserted to the effect that costs specifically unallowable under this principle shall not be allowable under other principles. We also recommended that the executive lobbying principle be structured in a manner similar to the legislative lobbying principle.

In closing, I would like to address the challenge presented to all of us by reform. In looking into implementation of reform packages,[4] we have found that it is important to the success of such improvement efforts to address (1) the need for a strong continuing top level commitment to reform and (2) the difficulty translating top level commitment into action and results at the program level. I think that these are two critical factors we want to keep in mind as we continue to evaluate DOD's implementation of the reforms that have been legislated in the last few years.

That, Mr. Chairman, this completes my prepared remarks. I would be happy to address your questions at this time.

Senator **Bingaman**. Thank you very much.

DEVELOPMENTAL TESTING

Let me ask Mr. Krings, first of all with regard to this question of consolidating the developmental testing into your operation as well.

Do you, and I think you partially responded to this in your earlier comments, but I would be interested if you could elaborate on it.

How objective can you be in a final operational test when in fact you have essentially become compromised by virtue of having signed off at earlier stages of the process?

Is it not true that you would have a great deal of explaining to do if the operational test did not come out as anticipated or as hoped by virtue of having been part of the evaluation process in earlier stages?

Do you see any conflict that you would build in if this type of consolidation would take place?

Mr. **Krings**. Clearly, the potential is there. But the potential is there now, and it always has been there, because operational testing is not a singular event at the end of the entire process.

Today, as in the past, "final exam" operational testing is kind of a peak. Initial operational testing is done earlier. It isn't really a very extensive evaluation, but there is a judgment made as to the potential suitability and the effectiveness of weapon systems.

If we are effective today in looking at operational testing early and then looking at a final operational test, it wouldn't be different in my view if we were looking at development testing early to see if in fact they are or have good potential of achieving what is called for by the system requirements.

I think that we have to be kept in a position of having to prove over and over that we are in fact independent and objective. I think, in any case, even if we just retained operational testing at the end only, that has to be done. There is a real potential, as we have seen in the past, for this objective, independent operational testing to be absorbed by the advocates.

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[4] DOD's Defense Acquisition Improvement Program: A Status Report (GAO/NSIAD-86-148, July 23, 1986).

I believe that the creation of our independent office by the Congress makes that independence much more easily maintained, and what we see is an opportunity to extend that independence and objectivity so that we do not get far into the development of a weapons system before we know its problems and correct them.

On balance, given the fact that everything is a risk, the independence and objectivity of early test reporting in an independent fashion would add significantly to the judgments that are made on a weapons system at an early stage of its life, especially in those programs which have a degree of concurrency. Whatever the degree of concurrency is, we just can't wait until operational testing is done in order to determine whether or not the system is going to perform satisfactorily.

There is a risk, I agree. But I think the reward is far, far greater than the risk.

Senator BINGAMAN. Mr. Conahan, did you have any thoughts on this same point?

Mr. CONAHAN. I would want to carefully analyze the responsibilities and the decisions that are going to be given to Mr. Krings' operation.

I quite agree that his organization needs to be on top of the results of development testing at it takes place to provide a basis for them getting into operational testing. I share the concern that he mentioned, and the concern that you mentioned that there may very well be a lessening of objectivity in calling the operational shots, the way they are if you have had a large role to play in the development of a weapons system.

Development testing is different in nature than operational testing. Development testing is designed to assure that the system, or subsystems meet the technical specifications. Operational testing is designed to assure that the end item will work in an operational environment, with soldiers if you will.

I don't stand here to oppose it at the moment, but I do think it requires much more careful analysis before we buy into it.

ADEQUACY OF RESOURCES

Senator BINGAMAN. Let me ask Mr. Krings if you would just comment on your view as to the adequacy of the resources you have to do the job that you have been given.

It seems you have 26 people on your staff, is that accurate?

Mr. KRINGS. That is correct.

Senator BINGAMAN. It seems to me we have given you an awful lot to do with 26 people. What are your thoughts as to the resources you have for the present functions which you are required to perform, and then of course, what additional resources would be needed if these additional responsibilities were also.

Mr. KRINGS. We presented a plan that essentially gave two options.

One must recognize that there is a tremendous number of activities that are common to both, that are not D or O but are just testing—like the development testing organization owning the oversight of all test facilities. This makes it difficult for operational testers to influence that. So a large part of the consolidation does not have to do specifically with the execution of a development or an operational test, but the support thereof.

In these two options we said, if things remain exactly as they are now, we need 20 more people in our office to fulfull the tasks as we need them now.

Plan B was, if there is a consolidation, to get more efficiencies from the consolidation, we could operate with both organizations put together in terms or people—not necessarily in terms of function, but in terms of people—plus 12 people. The judgment was made to go, to attempt the consolidation and add the 12 people.

We have been authorized 12 more people, and we are in fact pursuing these 12 people, and we have made decisions on probably at least 30 percent of them. The authorization really only came in the past 30 days or so. Basically, we need 22 more if we do not consolidate, 12 more if we do consolidate. The decision was to authorize the 12, which we are pursuing.

In either case, we intend to take some of these people and put them into remote locations where they could significantly increase that observation activity, the lack of which we have been criticized for. So we feel with these numbers, we can do the job that we are supposed to do.

ADEQUACY OF STAFF SIZE

Senator **BINGAMAN**. Mr. Conahan, do you have any thoughts as to the adequacy of that size staff? Does adding 22 people in your view provide adequate resources?

Mr. **CONAHAN**. At the time that we did our review I think Mr. Krings indicated that he would need 40 people to perform the responsibilities that were assigned to him at that time and to do some of the things that we felt were not being done. For example, to get out into the field and to have more first hand observation of the tests that were taking place. We had no reason to disagree that that was the level of staff needed at that time.

Now in terms of the numbers that derive from any reorganization or picking up responsibilities with respect to developmental testing, that is something I would have to take a look at. But in terms of what I think he needs for increasing some other activities, the earlier numbers certainly seem to be in the ballpark.

TEST FAILURES

Senator **BINGAMAN**. OK. Let me ask any of you about a theme that has come up in each of the hearings we have had, the problem of how you develop a system that permits test failures as a normal part of the developmental process.

I think the concern that has been expressed by several witnesses in previous hearings is that we put such a premium on successful tests that innovation is stifled. Efforts to really reach out and try new and difficult tasks are stifled. I would like to hear any of your comments. Mr. Krings you could give us your thoughts first. Is there something we can do legislatively or structurally to ensure that successful testing not become the end result that everybody is striving for at the expense of everything else.

Mr. **Krings**. It can be done, but it is extremely difficult. It takes a change in the mindset of testing.

It takes a change to make testing an incentivised activity, as opposed to an avoided activity. I think if we were to some way or another remove the predatory events that sometimes come as a result of uncovering failures, that would certainly help a little bit.

The fact of life is that, if someone fails in a competing society, for money or whatever it might be, they tend to be injured as a result of that. We are trying to create an atmosphere that says, every time you build a new product there are flaws in it; we know there are flaws in it. And finding the flaws as quickly as possible should be rewarded, because we are going to perpetuate those flaws in production if we don't find what they are early.

So there has to be a mindset that recognizes that finding flaws is the purpose of doing testing. And, therefore, the quicker you find them, especially the bigger they are, the more success you are having in testing. Because if it is in there, somebody's going to find it. We are trying to preclude the user from finding it when he is in fact trying to accomplish whatever he is supposed to do with the piece of equipment that he is getting.

It is not easy to do, but I think it definitely can be done. And it is clearly the only way that we are ever going to achieve reduction in time to produce weapon systems that works. It is the only way.

POLARIS TEST

Senator **Bingaman**. One example we have heard of from several witnesses is the Polaris test. The first seven tests there were unsuccessful, and we learned from those and continued with the program. Obviously with eventual great success. But were things different? That was 25 years ago. Was it a very different atmosphere? I mean could that happen today? Could you have a program which failed seven tests in a row and continued on?

Mr. **Krings**. In the predatory atmosphere that exists in this building, I doubt if that is at all possible.

Senator Bingaman. I am not sure it is just this building. I agree it is this building. But I think it is built into the system. Mr. Conahan, did you have any thoughts on this?

Mr. **Conahan**. Well no, I just fully agree. I think it is a subset of the bigger consideration. In the Pentagon you get rewarded for fielding a system. There are very few rewards for killing a system. I think that testing is part of that. I think that other support activities follow right in line. Such things as contract administration, I believe, oftentimes are looked at in that same light. You contribute to the fielding of a system, and that is where the rewards are. I think that testing essentially is in that same category.

Senator **Bingaman**. Mr. Vander Schaaf.

Mr. **Vander Schaaf**. I would simply add that we do look for failures in our weapons systems with the idea of improving those systems. We do not necessarily work to cancel them. I can give you three examples of systems that my office looked at and found major problems in the test phase. However, we did not recommend canceling or eliminating the program.

One was the Marine Corps' air-cushioned landing craft. Another was the High Mobility Multipurposes Wheeled Vehicle (HMMWV) which is a small, three-quarter ton, cross-country truck that the Army is producing. We found a number of problems in testing that. Another one was the Army's helicopter improvement program.

In all of those cases, there was an attitude of slow down, fix the problem, but keep the program. I don't think there is an automatic desire to terminate these programs when we find problems. I don't think you should believe that.

Mr. KRINGS. I don't think within the Department that is true. I agree that within the Department we could probably take care of it. But there is concern over, quite truthfully, the guy who builds the competitor in his state. That is the concern.

Mr. VANDER SCHAAF. There is also a great deal of pressure not to reveal those shortcomings; not to point them out. We see that as our job when we examine a testing program. If somebody is not putting out a complete test report or not discussing some of the shortcomings that the tests are showing we must get those problems out and make management aware of them.

PROBLEM OF DUPLICATION

Senator BINGAMAN. Let me also ask Mr. Vander Schaaf if you would comment on the problem of duplication in review of programs. That is something the Packard Commission made reference to. They felt there was a significant amount of duplicative audits of defense contractors.

We hear that repeatedly from people in the defense contracting business. Is this a serious issue that needs to be addressed by the Congress in your view? Have we built too many layers of review and audit into the system, or is this something that can be done administratively?

Mr. VANDER SCHAAF. My answer is rather long. I want to take you through this problem and try to give you a little bit of background, Mr. Chairman. I will do this very briefly. This is a potentially serious problem and I think it needs some definition and some scope.

If you recall, this issue was raised in the spring of 1985, when two chief executive officers, I believe from Lockheed and Martin Marietta, testified before a subcommittee of the Senate Armed Services Committee. They claimed that they were being audited to death. That was difficult to believe. I appeared with Inspector General Joe Sherrick and we testified before the same subcommittee that we had found no evidence of duplication by DOD auditors. We said we knew where every one of our auditors were, and we had fairly good information on where the General Accounting Officer auditors were at any time. We also knew where the Defense Contract Audit Agency auditors were, and we did not see a problem with auditors. We did not know what their complaint was with respect to auditors.

After the hearings, the two CEOs paid visits to us and explained their situation more fully. What they were really talking about was the plethora of oversight functions within the Department of Defense that visit their manufacturing facilities. Representatives from the contract administration offices, procurement buying centers, program offices, test and evaluation activities of the Department of Defense, et cetera all visit their plants and want data of one kind or another. This ties up people in briefings and other assistance activities.

We agreed to examine the problem of DOD oversight organizations. We went out and took a look at the experiences of Martin Marietta and Lockheed and came back and said yes, you are correct. When you talk about "auditors" in the general sense, and by the term meaning any DOD employee who walks through a facility or requests information and count that person as an auditor, then you have a problem.

However, if you are talking about people who come to a facility and, using the guidelines of the American Institute of Certified Public Accountants or the standards for conduct of audits in the Government that the Comptroller General lays down, then we do not see a problem. They basically agreed with us.

The Packard Commission issued its report about the same time we made our findings. The Commission hired a certified Public Accounting firm to look at this problem, and reached basically the same conclusions that my office reached on this matter except that they erroneously attributed the problem to the contract audit follow up programs alledged impact on contracting officer's authority.

Congress then took action as part of the establishment of the Under Secretary of Defense for Acquisition and gave him a mission to do something about this problem. We fully support his attempting to correct this.

Unfortunately, the problem is quite large, and requires some major overhaul of the contract administration function and how it is carried out in the Department of Defense. To date, we have not seen much movement in this area in order to reduce this problem. In fact I just checked on this in the last month or so, because I knew I would be testifying before this subcommittee.

Last September, after we had issued our report on this matter, we made two recommendations. I would like to read those to you.

We recommend that the Assistant Secretary for Acquisition and Logistics, now the Under Secretary for Acquisition, direct contract administration officers to exercise increased controls over requests by external oversight organizations for access to contractors records. We wanted these offices to assure that requested information is not readily available from another DOD organization. That was our first recommendation.

Second, we said Congress should more clearly define the responsibilities of DCAA, the price analyst, and the spare parts audit teams for evaluating contractors proposals.

As a result of these recommendations, and similar recommendations made by the Packard Commission, the Defense Acquisition Regulations Council opened a case in the middle of 1986.

In September they gave us a status report, and it said as follows: "DAR case 86-14 was established and assigned to the DAR subcouncil for necessary action. In September 1986 you were advised that a contract pricing committee report had been completed and was being coordinated with the contract administration committee, and that a fully coordinated report would be submitted to the DAR subcouncil as soon as the coordination was accomplished."

We expected that the regulatory body would take some action last fall. I wrote them again in February of this year. I received a response on 20 March 1987 from Ms. Spector who is the Deputy Assistant Secretary for Procurement. And I quote "My review of your follow up request regrettably discloses that due to a communication error, no action has been taken on DAR case 86-14 since your previous follow up. As a result, I have directed that action on this case be completed by May 15, 1987, but for higher priority statutory cases it would be sooner."

I am not aware of any regulatory or administrative action on this matter that has taken place within the Department.

In addition, I should point out that we have recently completed an inspection of the DCAS, that is the Defense Logistics Agency's Contract Administration Services.

This organization was created in the 1960s with the view that the Department would exercise one face to industry. The Army, Navy, Air Force would not be giving industry different rules, regulations, and procedures. That is along the lines of your legislation last year establishing an Under Secretary for Acquisition.

I will briefly give you one of our summary findings from our inspection of DCASRs and contractor facilities all over the country. Most of this was in DCASRs which are Defense Contract Regional Offices, and DCASMAs, which are the next layer down. We also went to some plant offices. This inspection revealed that the buying activities routinely disregarded the disciplines envisioned during the establishment of the Contract Administration Service. The one face of Government to private industry concept just wasn't taking place.

We had 23 supporting observations to these summary findings. If you want me to I can summarize these for you or I can put them in your record. But the point is, we have not made a lot of progress on this problem.

GOVERNMENT'S HELPING HAND

Senator **Bingaman**. Let me just ask the obvious follow up. One of our witnesses earlier said the helping hand of Government strikes again. Should Congress wade into this, or is this something we need to begin a stronger oversight of? What is your view?

Mr. **Vander Schaaf**. I do not think legislation is appropriate at this stage. I think you should give Dick Godwin a chance to deal with it. I have tried to deal with it from our side of the house, from the DCAA and the IG auditors. With respect to the General Accounting Office, to the extent we know what they are doing, we try to be sure we are not duplicating their audit efforts.

A lot of the duplication takes place in the contract administration side. It does not take place on the audit side of the house.

The contractor does not really know the difference in responsibilities of various Government officials, and he does not really care. But the correction of this problem is outside of my jurisdiction. It is under the jurisdiction of the Under Secretary of Defense for Acquisition. I do not think the answer to this problem was the recommendation of the Packard Commission, which was to give the Under Secretary for Acquisition responsibility and authority for how audits are performed.

I think that is putting the fox entirely in charge of the chicken coop. Mr. Godwin and I can work on some of these things and we can resolve these issues.

However, auditors must remain independent if you are going to place trust in the results of their audit reports. When I say "auditors" in this case, I mean auditors who do work under the direction of the accounting standards issued by the Comptroller General of the United States, and prescribed by the American Institute of Certified Public Accountants. I do not mean every Government employee who visits a contractors' plant.

Senator BINGAMAN. All right. There are several other questions that I may submit for a written response if I could. But I think that concludes the ones I needed to ask today. I appreciate your patience in struggling with our schedule up here. Thank you very much.

[Questions for the hearing record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR JEFF BINGAMAN

DEFENSE ACQUISITION SYSTEM

Senator BINGAMAN. Your charter defines the acquisition system as a single uniform system for planning, developing, acquiring, maintaining, and disposing of equipment, facilities, and services. Given the long history of interservice rivalry and service resistance to direction from OSD, isn't it fair to describe this as a "goal" rather than as a "definition"?

Mr. GODWIN. The definition of the defense acquisition system was included in the charter for the Under Secretary of Defense for Acquisition (USD(A)) as a way of clearly identifying the breadth of his authority and responsibilities. It also describes elements included and managed within the DOD acquisition system. In this respect, it is a definition. However, the definition can be looked upon as a goal in the area of uniformity of the system. Our goal is to provide uniformity to the extent that is consistent with having a single acquisition system. We will have achieved success when an acquisition official in one service could be assigned to another service in a similar capacity and be immediately effective.

Senator BINGAMAN. What steps are needed to make this goal into a reality and what timeframe is needed to do so?

Mr. GODWIN. We have been working on the changes necessary since I arrived last fall—we continue to assess the areas where lack of uniformity makes a real difference. We are concurrently working with the services' organizations in the acquisition system to adjust necessary practices toward more consistency and uniformity. As much of these practices evolved over a number of years, we do not expect to see results overnight.

Senator BINGAMAN. In your statement, you note that you are creating an acquisition information system for the entire DOD acquisition process.

a. Please describe the types of procurements that will be included in that system and the types that will be excluded?

b. In what specific ways will that information assist you in managing the procurement process?

c. When will it be fully operational?

Mr. GODWIN. Although the Acquisition Information System (AIS) is still under development, it will include performance status assessments for individual weapons systems, laboratories, test ranges/facilities, military construction projects, and logistics and related support activities.

The AIS is designed to support two levels of DOD management: senior executives and action officers in OSD and the services. Senior executives will be provided with performance status assessments which identify problems on an exception reporting basis. Action officers will receive more detailed information upon which they can perform independent program analysis.

The new system is being implemented in two phases. Phase I includes all major programs and selected high dollar procurements and will be operational in the near future. Phase II will include other programs such as laboratories and facilities and should be operational in late summer 1987.

REDESIGNATION OF ACQUISITION AND LOGISTICS

Senator **Bingaman**. You have redesignated the Assistant Secretary for Acquisition and Logistics as the Assistant Secretary for Production and Logistics. What aspects of the acquisition process will be excluded from his direct purview?

Mr. **Godwin**. The general scope of his purview remains unchanged. The change in title is intended to more accurately describe his responsibilities.

Senator **Bingaman**. In two of the services, the Acquisition Executive is the Under Secretary. In the Navy, it is the Service Secretary. Given the span of responsibilities of the Service Secretary, can the Service Secretary meet your expectations in terms of the duties that must be performed by the Service Acquisition Executive?

Mr. **Godwin**. It is probably too early to know the full answer to this question. We are working within the acquisition system to determine how we should operate on this issue.

Senator **Bingaman**. You have noted that you are in the process of reducing the number of acquisition committees from 126 to 10. To the extent that these committees are composed of persons not assigned to OSD, what authority or direction do you exercise over the performance of the committee's functions?

Mr. **Godwin**. The committees you are referring to are advisory committees. Their recommendations must be approved through normal management procedures prior to any action being implemented. The USD(A) will have complete authority over those committees which have been established to advise him.

Senator **Bingaman**. If a member of such a committee does not meet your standards of performance, can you have that person removed?

Mr. **Godwin**. In the unlikely event that a member of a committee responsible for advising the USD(A) fails to perform in an acceptable manner, I can see nothing that would prevent us from making an appropriate change of personnel.

TEST AND EVALUATION

Senator **Bingaman**. Have you encountered any problems in the performance of your job as a result of the "independence" of the Director of Operational Test and Evaluation?

Mr. **Godwin**. Yes. I believe the Operational Test and Evaluation Office should report to me. I have been delegated, by the Secretary of Defense, the responsibility and authority to manage the DOD acquisition system. I believe that operational test and evaluation is an important part of that system, and that I should have access to the necessary information directly, not through the Secretary of Defense.

I am just as "independent" as the Secretary in terms of the acquisition functions. I am not an advocate of any weapon system. I seek performance and quality; therefore, I have no reason to be bypassed by another independent element of the acquisition system. I urge you to consider repealing the legislation which assigns the Director of Operational Test and Evaluation to the Secretary of Defense.

Senator **Bingaman**. Please describe the difference between "operational" testing and "developmental" testing and explain why developmental testing originally was not included under the Director of Operational Test and Evaluation.

Mr. **Godwin**. Developmental test and evaluation (DT&E) and operational test and evaluation (OT&E) are independent activities that run concurrently and share each other's data but clearly have different objectives.

DT&E is an integral element of the weapon system development process. It provides engineering feedback (engineering test and evaluation) that aids the design and engineering process. It also provides data used to verify the accomplishment of technical performance goals (technical compliance test and evaluation) documented in contract system specifications. Development testing is normally done at highly instrumented contractor and Government facilities and ranges. It is performed by civilian, military and industrial professionals.

OT&E, on the other hand, is user-oriented testing specifically designed to determine whether or not the weapon system will be operationally effective and suitable for use in combat by typical military forces. To assure it's objectivity, OT&E is usually performed by service operational test agencies that are independent of the development community.

Since it's establishment in 1971, the OSD test and evaluation office had responsibility for both DT&E and OT&E. However, Public Law 98-94 (September 24, 1983), specifically established OT&E as an independent function, separate from the program development function within the Office of the Under Secretary of Defense Research and Engineering, as it was then called and whose purpose was to ensure that systems being recommended for production were usable by the operating forces of the Department. OT&E was, and still remains, a separate function from the purpose of DT&E. Consolidation of all OSD-level T&E functions under the director, OT&E (DOT&E) was given consideration when that office was initially formed. However, it was decided that the new director should be allowed to establish himself, his office and his style; implement the law; and have an input to the consolidation question.

Senator BINGAMAN. Why is such a consolidation being considered at this time?

Mr. GODWIN. DOTE does not have sufficient manpower to perform its mission. This consolidation would centralize T&E policy and oversight management responsibilities and efficiencies can be realized in the use of facilities and manpower.

Senator BINGAMAN. What are the advantages and disadvantages of such a consolidation?

Mr. GODWIN. The most important advantage is that we would have a single spokesman on the Department's test and evaluation matters. This would have benefits in policy and in our budget process. The other advantages would be a potential for avoiding any duplication of effort and saving of manpower spaces. The disadvantage may be that without a dedicated T&E staff within OUSD(A), some development T&E issues may not be communicated to the acquisition executives.

COMPETITION IN CONTRACTING ACT

Senator BINGAMAN. We've heard much about the impact of the Competition in Contracting Act (CICA) in terms of promoting competition.

a. Do you have any way of measuring the dollar savings that have resulted from the act and your implementation of it? If so, what savings have been generated?

b. Do you have any estimate of the impact on the strength of the industrial base?

c. What impact has the act had in terms of risk-taking and innovation?

Mr. GODWIN. We cannot identify overall dollar savings resulting from CICA. There have been some individual cases of savings when previously sole source items are competed, but whether that occurred as a result of CICA or our own initiatives or whatever, one cannot say. Many of our competition initiatives have been underway since 1981 with a steady improvement in competition rates. Our major thrust has been to change attitudes to create more opportunities for effective competition which, due to our increasing competition rates, we think has been a success. Buying competitively but selecting that firm which gives the best value to defense is what we are now stressing to marry up our twin goals of competing while encouraging a viable industrial base. It is hard to gauge the impact of CICA in terms of risk-taking and innovation. There have been many complaints from the engineers and technicians that they cannot get the type of talent they need in time to support important tech base projects. However, we do not have data to support or refute this. We have asked our competition advocates to be sensitive to this and find ways where necessary to compete such requirements expeditiously.

EXEMPTIONS OF ENTERPRISE PROGRAMS FROM ACQUISITION REGULATIONS

Senator BINGAMAN. The Defense Enterprise Program authorized last year exempts specified programs selected by you from all procurement rules except for those imposed by statute and the Federal Acquisition Regulation. Is it possible to develop an Enterprise Program that would be exempt from the FAR, and possibly some statutory requirements, without creating a situation that would be detrimental to the best interests of Government and the taxpayers?

Mr. GODWIN. Unnecessary details and complexities in regulations inhibit the initiative of acquisition personnel including those with program acquisition responsibilities by limiting their ability to make sound business decisions in the best interests of the Government. We want to change the system so that there are as few constraints as possible on contracting officer's authority, and encourage contracting officers to take full advantage of their authority. To this end, we have established a pilot contracting activities program. The goal of this program is to identify regulations and laws that are unnecessarily complex or impose undue restrictions on the use of sound business judgment. For the test activities that are participating in this program, we have granted to the Military Departments and the Defense Logistics Agency authority to waive acquisition regulations not specifically required by statute or executive order. Upon completion of this test program and assessment of the results, it may well prove beneficial to apply these same procedures to enterprise programs. We are also studying the DAR and FAR to eliminate and simplify procurement procedures.

PROPOSED PROFIT POLICY

Senator BINGAMAN. Last year, the Department proposed a profit policy that was embodied in the Continuing Resolution. We have heard from many in industry that the profit policy is unfair and that it will have a negative effect on defense industry.

Can you set forth the basis for the policy?

Mr. GODWIN. DOD implemented substantial reforms in the way contracting officers develop prenegotiation profit objectives on defense contracts. The goal of the reforms is to influence reductions in contract price by making contractors more productive. There are several features of the new policy that contribute to this goal. First, the emphasis placed on capital investment has been both increased and refined. More profit consideration will be given to contractor buildings and equipment that have the potential for cost reductions. In addition, the profit rewards will be skewed toward investment in equipment. For example, no longer will any profit consideration be given to contractor investment in land. Second, the emphasis on contract cost has been correspondingly reduced. The contracting officer's analysis will now be directed at the technical risks, management involvement, and cost control related to the specific contract action. The contracting officer's assessment will not be based on individual elements of cost, as had been done under previous profit policies. We want to remove the incentive for contractors to receive more profit for more costs. Finally, the policy has been made more sensitive to changes in the economic environment. The contracting officer will give explicit consideration for contractor working capital needs and the related costs. This was necessary to address the impact of interest rates, progress payment rates, and contract variables on contractor cash flow which is vital to efficient contract performance.

Senator BINGAMAN. Do you intend to propose any changes in profit policy this year?

Mr. GODWIN. A proposed profit policy had been published in the Federal Register for public comment on September 18, 1986. However, subsequent to that publication, Congress passed a provision in the DOD Appropriations Act of 1987 requiring DOD to issue a new profit policy. Because this provision was effective on all solicitations issued on or after October 18, 1986, DOD issued the proposed policy, with some modifications, as an interim rule. The Conference report stated that the proposed rule appeared to be consistent with the conferees' policy objectives.

The interim rule was published for public comment in the Federal Register on December 1, 1986. The purpose of this process is to allow the public an opportunity to participate in the final rule. To date, we have evaluated more than 124 letters containing over 400 comments/suggestions for improvement. DOD will give full consideration to all comments/suggestions when issuing a final rule. We do not believe that additional legislation is necessary in this area.

PROFIT REPORTING SYSTEM

Senator BINGAMAN. The General Accounting Office has proposed that anyone outside DOD have the responsibility to collect, and analyze defense contractor profits on both military and commercial work. At least one bill has just been introduced in the Senate to implement that recommendation. Do you have a view on the appropriateness of a mandatory defense and commercial profit reporting system undertaken by someone outside of DOD?

Mr. GODWIN. DOD has reservations with the GAO proposal. In our view, more work needs to be done before it is submitted as a legislative proposal to Congress. We have been concerned about the cost/benefit trade-offs of a profit reporting system over systems that are already employed by DOD. In addition, there needs to be a universally acceptable method of performing profit comparisons between negotiated defense contracts and profits earned in the commercial market place. We have said that we will work with Congress and GAO to get a better handle on these problems.

Senator BINGAMAN. Even if there could be agreement on what a policy should be, what actions do you have at your disposal to ensure that the profit policy is uniformly applied across the services and defense agencies?

Mr. GODWIN. DOD already maintains a management information system that collects information on contracting officer prenegotiation profit objectiveness and negotiated results. The type of information collected will allow DOD to monitor the effect of profit policy changes.

Senator **Bingaman**. Having come from the nondefense sector, do you have an opinion on the need for the Government to have access to commercial sector data in order to determine an appropriate negotiation objective for certain large defense contracts? Do you believe that the Department, or some outside entity, could ensure the protection and confidentiality of that highly sensitive commercial data?

Mr. **Godwin**. DOD has a long history of using commercial sector data to assess its profit policies, and this will likely be necessary in the future. However, DOD has been able to obtain this information voluntarily, as well as tailor it to specific study objectives or initiatives. I share the concern with maintaining the confidentiality of the highly sensitive commercial data. I believe the GAO proposal needs more work in this area. From DOD experience, such data had to be collected through an independent certified public accounting firm outside the control of the executive branch.

Senator **Bingaman**. A good deal of the criticism of the Department's contractor profit study (DFAIR) had to do with the methodology and assumptions used by the working group. Could (and should) Congress set out what the profit study should be? Would that leave DOD in a better or worse position to negotiate on Government contracts?

Mr. **Godwin**. Congress should not set profit policy. It is best handled by regulation. The principal reason is that Congress could not be expected to foresee every condition that is present in negotiated contracts. The Weighted Guidelines Method is designed to consider dozens of contracting variables involving contractor performance risk, contract type risk, contractor capital investment, and contract financing to name just a few. Legislation would leave DOD in a worse position. The most recent case study has been determining Congress' intent with the profit policy reforms in Section 9105 of the DOD Appropriations Act of 1987. There has been considerable discussion between DOD, Congress, and the professional and technical service industries on intent.

STATUTES/REGULATIONS OF CONCERN TO INDUSTRY

Senator **Bingaman**. Your background is industry, and you are in constant contact with leaders in the defense industrial community. What statutes and regulations at this time appear to be of the greatest concern to industry?

Mr. **Godwin**. Industry in general is concerned with the quantity, complexity, detail, and pace of recent legislative change. They are concerned about the cumulative effect of the new laws and adapting to them. Specific examples of legislation industry is unhappy with are the progress payment reduction and the requirement for contractor financing of special tooling and test equipment.

Senator **Bingaman**. What is your approach to analyzing these concerns?

Mr. **Godwin**. Any changes necessary to the existing rules would be published in the Federal Register as draft rules available for comment by Congress, industry, and the general public prior to issuing final changes.

Senator **Bingaman**. Can we expect in the near future to have proposals from you on specific changes in law?

Mr. **Godwin**. Yes. We are currently analyzing numerous legislative ideas intended to streamline and improve the Defense acquisition process. As soon as we develop these into a coherent legislative agenda, we will submit our recommendations for review within the executive branch and clearance by the Office of Management and Budget, and then forward them for you consideration.

ACQUISITION POLICY

Senator **Bingaman**. You are in the process of examining internally imposed rules to determine where streamlining can be effected without congressional action.

a. To what extent are you limited in this effort by the fact that DOD does not exercise ultimate authority over the Federal Acquisition Regulation?

b. In view of DOD's role as the major purchaser of goods and services for our Government, can a case be made for excluding DOD from control by other executive branch entities in the performance of acquisition functions?

Mr. **Godwin**. a. Cases take longer to process and other agencies requirements may impact changes which DOD proposes.

b. Yes. Since we are solely responsible for the overall defense mission we must have the ability to make regulations affecting defense procurement. Also, we do represent 80 percent of overall Government procurement.

DEFENSE ACQUISITION SYSTEM

Senator **Bingaman**. In terms of your ability to effectively manage the oversight aspects of the acquisition process, please describe your organizational relationships with the Comptroller, and the DOD/IG, and the Assistant to the Secretary for Program Analysis and Evaluation.

Mr. **Godwin**. All of these organizations have a major support role in the defense acquisition process. I have no line or staff relationship with them other than to coordinate our activities. Some of their functions, I believe, are more properly in the OUSD(A). There will be close interaction among all three and the USD(A) on acquisition matters in the meanwhile.

ACQUISITION WORKFORCE

Senator **Bingaman**. Are you satisfied with the action to date to establish career patterns, educational requirements, and experience levels for the acquisition workforce, or do you think that additional improvements are needed to enhance the status of the Government's procurement personnel? If so, what do you recommend?

Mr. **Godwin**. The Department of Defense has established experience, education, and training standards for program management, contracting, and quality assurance personnel. We are now in the process of putting into place mechanisms for ensuring that our people receive the training and experience required by these standards.

Thus, I am satisfied with the progress that the Department has made in this area. On the other hand, there is more that could, and should, be done. However, action by Congress is necessary.

One extremely important means for improving the acquisition workforce is to establish a simplified, flexible personnel system such as that being demonstrated by the Navy's laboratories at China Lake, and San Diego, CA. However, doing so on other than a demonstration basis requires changes to Federal civil service laws.

The administration's proposed Civil Service Simplification Act would allow for careful, budget neutral expansion of the Navy's successfully demonstrated system. The Department of Defense strongly supports this legislative proposal and believes it would provide the flexibility necessary to attain the desired enhancement of professionalism of acquisition personnel. Unfortunately, the administration has been unsuccessful at getting this legislation introduced in the 100th Congress.

While the Department views the Civil Service Simplification Act as the long-term solution for personnel management improvement, other avenues are also being pursued. The prospect of establishing firm educational requirements as a prerequisite for entry into the Contracting Series, GS-1102, has been pursued with the Office of Personnel Management (OPM). OPM has advised that such requirements are precluded, in the case of this occupation, by the provisions of 5 U.S.C., 3808.

The Department would welcome a modification to 5 U.S.C. 3808 that would allow OPM to establish appropriate educational standards for the Contracting Series, GS-1102, in conjunction with the Department of Defense. A college degree requirement represents the optimum standard that we would seek.

RELATIONS WITH INDUSTRY

Senator **Bingaman**. One of your priorities has been to improve the Department's relationship with industry? It is my understanding that Mr. Costello has a similar initiative of his. Has the Department's relationship with industry in the area of acquisition policy deteriorated over the past several years? What specific actions do you have in mind to improve those relationships?

Mr. **Godwin**. We must ensure that the proper arm's-length relationship exists with industry, since they are vital to national defense. Dr. Costello reports to me and has developed the initiative that I have referred to. It includes:

a. Survey industry and Government on the current condition of relations between Government and industry in the field of procurement.

b. Initiatives to support the role of the contracting officer.

c. Develop legislation to support commercial style competition.

d. Expand DAR Council meetings with industry.

e. Survey major industry association for examples of duplicative reviews by the Government and prime contractors.

f. Review best practices approach for self governance activities of major contractors.

g. Review special tooling and test equipment policies.

h. Expand meetings with industry representatives to discuss procurement issues.

i. Review practices on cost-sharing contracts.
j. Review implementation of technical data regulations.
k. Review impact of new profit policy on all sectors of industry.

ACQUISITION POLICY

Senator BINGAMAN. One of the key reasons that Congress concurred in the Packard Commission's recommendation to establish your office was to ensure that there would be uniformity of acquisition policy throughout the Department of Defense. To the extent that there have been delays in getting your charter approved and in staffing your office, the services have been able to engage in ad hoc policymaking. What actions are you taking to take control of the DOD acquisition policy system?

Mr. GODWIN. The Federal Acquisition Regulation and the Department's Supplement comprise uniform acquisition policies which are followed by the Department. I meet on a regular basis with the Services' Acquisition Executives and among other things review all requests for waivers and deviations and approve or disapprove them as appropriate. In addition, the Defense Acquisition Board monitors service acquisition policies as they are applied to major acquisitions. A thoughtful analysis and evaluation to ensure that the stated policy and its application at the service level are consistent with departmental guidelines is in progress.

SPECIAL TOOLING AND TEST EQUIPMENT

Senator BINGAMAN. We have heard that each of the services have taken a different approach in the implementation of last year's legislation dealing with the limitation on special tooling and special test equipment. What action will you take to ensure uniformity in the application of the congressional legislation across DOD agencies?

Mr. GODWIN. The requirement was implemented with an interim rule on January 16, 1987. A DOD working group is conducting a study to determine if changes to the policy are needed.

RIGHTS IN TECHNICAL DATA

Senator BINGAMAN. Data rights seems to be another area where there is a critical need for uniformity. To date, different rules have been implemented by the Joint Logistics Commanders, the Air Force, and the Navy. Do you expect to achieve a consistent DOD-wide data rights provision that meets the requirements, rights, and liabilities which Congress spelled out in explicit detail in law and report language last year?

Mr. GODWIN. Yes. The DAR Council is finalizing the implementation of the law for the DOD Federal Acquisition Regulation Supplement (DFARS). The new regulatory coverage will result in a policy on Rights in Technical Data that is more uniform than we have had for some period of time. I have specifically requested the Joint Logistics Commanders to assist in the melding of their policy into the DFARS. The policies of other DOD elements including the military departments will have to be consistent with this new DFARS policy.

The revised coverage is one of the most significant actions in past years. It balances the Government's need to encourage innovation and private development for satisfying Government requirements with the sometimes conflicting need to obtain rights in technical data for purpose of competition.

The Council has based the new regulatory coverage on Section 953 of Public Law 99-500, the various congressional reports accompanying the legislation, the Packard Commission recommendations and public comments received in response to the Federal Register notice of January 16, 1987, as well as public meetings.

FINANCIAL IMPACT OF POLICY CHANGES

Senator BINGAMAN. There have been a vast number of changes to the financial side of the defense industry. These included reductions in progress payments, changes to the profit policy weighted guidelines, imposition of special tooling costs, increased cost-sharing on contracts, and others. Given all these changes, what is your sense of the defense industry's profitability, and capability for investment in the future defense industrial base?

Mr. GODWIN. We expect profits will go down on the average; however, it is difficult to precisely quantify. In my view any one of these reductions was not serious but taken together they appear to have had a strong negative result. We have a review in progress to determine their net effect. We will take corrective action if the resulting impact is as we now think is the case.

INDEPENDENT RESEARCH AND DEVELOPMENT

Senator **Bingaman**. There has been some increased attention focused on the independent research and development programs undertaken by contractors and shared in, in part, by the Department of Defense. Do you believe that the Department of Defense, and the Nation, has benefitted from the existence of, and congressional funding for, the IR&D program?

Mr. **Godwin**. Yes, it is our belief that the Department of Defense and the Nation have benefitted from the existence of Independent Research & Development (IR&D). IR&D is that research and development which companies themselves independently initiate, fund, and manage in order to maintain their technological competitiveness, and it is to be separately distinguished from other research and development work which companies perform under contract subject to terms and conditions specified by DOD. Significant benefit derives from the fact that industry's own perspective on what research and development is most promising is reflected in IR&D, whereas their contracted research and development industry must focus only on directions specified by the customer. In a typical example of IR&D activity a company developed both a parallel processor computer architecture and a custom VLSI processing chip which greatly reduce total processor size and made airborne use feasible. This found application in DOD and led to more than an order of magnitude improvement in the tracking capability of an E-2C surveillance aircraft, permitting it to carry out missions and operate in environments which it could not otherwise do.

The costs of IR&D are recovered by each company through overhead charges on its products both military and commercial (just as an auto manufacturer recovers its research and development costs by assigning a fraction of those overhead costs to the sale price of each auto it delivers). To assure that IR&D overhead charges are reasonable, DOD conducts extensive technical and military-relevance reviews, as well as fiscal audits of all contractor IR&D activity. In 1985 DOD paid $2.1B in IR&D overhead charges. This amounted only to a portion of the worth of that IR&D activity which DOD determined to be militarily relevant. In addition, DOD gained access, through reports, to the entire $5.0B IR&D program performed by defense contractors.

It is also pertinent that in response to a request from Congress, DOD has engaged RAND Corporation to conduct an independent objective evaluation of IR&D. The first, or qualitative, phase of this study has been completed and is supportive of IR&D. The second, or quantitative, econometric phase is in progress.

DEFENSE ACQUISITION SYSTEM

Senator **Bingaman**. Under the Goldwater-Nichols Act, each military department was required to eliminate duplication between the staffs of the service Secretaries and the service Chiefs, and to consolidate functions under the Secretaries. Please compare the consolidation plan for each of the services and comment on the differences among the plans in terms of fulfilling the mission of your office.

Mr. **Godwin**. Answer will be forwarded to the committee by June 26, 1987.

UNCOMPENSATED OVERTIME

Senator **Bingaman**. We have recently heard from some defense contractors challenging the practice of other contractors who submit low bids based upon the performance of uncompensated overtime by persons exempt from the Fair Labor Standards Act. This primarily involves professional and administrative workers who do not fall within the statutory entitlement to overtime pay. There are some contractors who, as a matter of personnel management, pay overtime to such workers even though not required to do so by law. There are others who do not pay such overtime. Those who provide overtime compensation believe that they are disadvantaged in the process of bidding for Federal contracts because their competitors are able to offer a greater number of work-hours at less cost by not paying overtime. From a procurement policy perspective, the issue has been raised as to whether the use of uncompensated overtime affects the quality of work or otherwise impacts on the realism of bids in contravention of the Federal Acquisition Regulations. From the perspective of the Department of Defense, what are your views?

Mr. **Godwin**. Contractors in the service industry, by extending the workweek, can often offer a more competitive price for the required services. We neither encourage nor discourage contractors from proposing employees exempt from the FLSA on a greater than 40 hour workweek basis. The decision is up to the contractor and how he perceives the competitive marketplace. Safeguards have been installed in contracts which should preclude manipulation. These would include provisions that all hours proposed and evaluated be delivered, that all hours be allocated their proportionate share of indirect costs, and that a high level of Government surveillance be maintained during contract performance, which is not atypical during the performance of such contracts.

COMPETITION IN CONTRACTING ACT

Senator **Bingaman**. In Mr. Conahan's testimony for this hearing on the subject of the Competition in Contracting Act, he stated that the Federal Acquisition Regulation is at variance with the intent of Congress "in several respects," citing the use exemption from competition for classes of contracts rather than exemption on a case-by-case basis. Would you please comment on this allegation?

Mr. **Godwin**. Subsequent to its initial implementation of the Competition in Contracting Act (CICA) DOD has taken steps to ensure consistency between the Federal Acquisition Regulation (FAR) and the act and in so doing has given full consideration to all public, industry, Government, and congressional comments. It has been and will continue to be DOD's intent to promugate regulatory coverage consistent with enacted legislation.

With regard to the regulatory language (regarding exemption from competition) at FAR 6.303-1(c) which permits agencies to execute justifications for other than full and open competition for classes of contracts while executing a justification on a case-by-case basis, the DOD in August 1985 replied to the House Committee on Government Operations and the Senate Committee on Governmental Affairs and later to the GAO (December 1985) essentially as follows. 10 U.S.C. 2310(a) reads "Determinations and decisions required to be made under this chapter by the head of an agency may be . . .". The operative words are ". . . by the head of an agency . . .". Only exception number 7, "Public Interest", requires an agency head determination; therefore, by law it is the only exception that cannot be made on a class basis. Permitting class justifications and approvals is a sound business practice particularly in those instances where it is known, in advance, that the same fact situation will recur on a repetitive basis e.g., (a) repetitive acquisitions from the Federal Prison Industries or the Government Printing Office or (b) repetitive acquisitions with a Government-owned Contractor-operated (GOCO) facility. To ensure proper application of the statutory authority FAR 6.303-1(c) was amended to add the following sentence. "Whenever a justification is made and approved on a class basis, the contracting officer must ensure that each contract action taken pursuant to the authority of the class justification and approval is within the scope of the class justification and approval and shall document the contract file for each contract action accordingly" (FAC 84-13, 8 February 1986). Further additional competitive actions serve to protect against possible abuses; these are the statutory requirement to synopsize proposed contract actions, or request offers from as many sources as is practical and the requirement to secure approval of the justification in accordance with agency procedures.

MILITARY WHISTLEBLOWER BILL

Senator **Bingaman**. Mr. Vander Schaaf, last year, the House proposed a military whistleblower bill that would have mandated IG review on an expedited basis, and which would have authorized a new form of civilian judicial review of military personnel actions. Based on your experience, should such statutory procedures be enacted with respect to military personnel?

Mr. **Vander Schaaf**. The Office of the Inspector General, Department of Defense is in favor of any measure which would effectively protect whistle blowers from harassment. However, we believe that safeguards already exist to protect military members from retaliation.

Those individuals who believe they have been wronged by their commanding officers may file complaints under Article 138, Uniform Code of Military Justice. Another remedy is available through the Boards of Correction of Military Records of the Military Departments. The Boards have the power under 10 U.S.C. 1552 to correct any military records to remove an error or an injustice. My office is also empowered to investigate complaints or reprisal from military members by Public Law 95-452, the Inspector General Act of 1978, as amended.

We have no indication that this present system has significant shortcomings that are likely to be remedied by additional legislation. I do not believe that additional statutory procedures are necessary.

DCAA EFFECTIVENESS

Senator **Bingaman**. Your statement notes that oversight by your office has resulted in "changes which dramatically improved the effectiveness of DCAA." What specific changes were made at your request and how have you measured the effectiveness of these changes?

Mr. **Vander Schaaf**. In the last several years we have observed many significant improvements in the performance of the Defense Contract Audit Agency (DCAA). While a large share of the credit for these improvements rests with the senior management of the DCAA, we believe that we have had an impact upon the direction of their efforts. Since early 1984, we have issued over 25 final reports on our oversight of the operations of the DCAA. These reports have contained more than 200 recommendations for the improvements in its audit operations.

Some of the more significant improvements we have noted in recent years in the operations of DCAA include:

The number of potential fraud referrals to DOD criminal investigative organizations increased from less than 50 in 1983 to about 300 in 1986.

The percent of audit effort devoted to compliance with the Truth in Negotiations Act increased from 4 percent in 1984 to about 6 percent in 1986.

More aggressive actions were taken to obtain access to those contractors' records required for the effective auditing of defense contracts.

Increased emphasis was placed on the quality of audit work and "Commitment to Excellence" Program has been initiated for this purpose.

The sustension rate for significant, post-award audit findings has increased from about 40 percent to about 70 percent.

In addition to prescribing overall DOD contract audit policy and evaluating its implementation, my office also monitors the performance of DCAA and the DOD contracting offices under the DOD Contract Audit Followup Program. This program, which was put into place in 1982 and is spelled out in DOD Directive 7640.2, has helped the Department to achieve more accountability in the use of contract audit advice. As mentioned in my statement, I view the followup effort as a key factor in the improvement and the overall payoff from contract audit followup.

AUDIT AND INSPECTION FUNCTIONS

Senator **Bingaman**. Is it possible to measure the effectiveness of audit and inspection functions in terms of weighing the cost to the Government of performing these functions, the cost to contractors of complying with audits and investigations, and actual dollar savings in procurement costs? Please provide the committee with any studies that have been done in this regard.

Mr. **Vander Schaaf**. Auditors, inspectors, and investigators review contractors for compliance with laws and regulations. It is the compliance with law and regulation that often requires large expenditures of funds. It is the contractors' responsibility to comply. If the contractor has complied, the audit or investigation is of little consequence and costs neither the contractor nor the Government any significant amount. Unfortunately, compliance with law and regulation is often not achieved, making the Government's reviews more costly and causing the contractor to expand funds to bring his operation into compliance.

While we cannot measure the direct benefits of all investigations in terms of dollar savings, we can reasonably estimate the return on investment from contract audits. The nature of investigations is that of a policing action for violations of law. Thus, they cannot be viewed in terms of a return on investment. Contract audit, however, can be relatively well measured. For example, in fiscal year 1986, the DCAA saved the Government $37 for every dollar invested in it. That's based on savings of $7.6 billion and operating costs of $205.7 million.

We have not performed any studies in this area, but our semiannual report to Congress reports the cost of operations and savings achieved for all DOD audit investigations and inspections organizations.

POLICY IMPLEMENTATION

Senator **Bingaman**. Your statement discusses the manner in which you follow up audits to ensure effective policy implementation. As a practical matter, giving staffing limitations, what percentage of audits are followed by detailed examinations to monitor implementation of your recommendations?

Mr. **Vander Schaaf**. All OIG, DOD audit reports are followed by detailed written inquiries from the Office of the Assistant Inspector General (Audit Followup) to the managers who are carrying out the agreed-upon audit recommendations. If a lengthy corrective effort with multiple milestones is involved, there may be several such inquiries and resultant management status reports. Our requests for followup status not only ask whether the agreed-upon actions have been taken, but also request appropriate documentation such as copies of revised regulations and statistical indicators. This coverage is supplemented on a case-by-case basis by field verification, which is on-site evaluation of the validity of the followup status data reported by managers. Although we obtain field verification coverage from several different sources—our auditors, inspectors, and audit followup personnel; Military Department auditors and inspectors; and the GAO—conflicting priorities have made it difficult to focus as much effort on this area as it deserves. According to our records, about 7.5 percent (68 of 909) of OIG, DOD audit reports in our tracking system have been covered to date by formal field verification reviews. We hope to increase that percentage in the future.

INVESTIGATIONS

Senator **Bingaman**. In addition to audits, you also are involved in investigations that lead to civil or criminal actions against specific contractors. Aside from the deterrent effect of such investigations, do they have any other effect on DOD procurement policy? Is there a formal way of translating "lessons learned" from such investigations into specific changes in acquisition procedures?

Mr. **Vander Schaaf**. I would say that, for other than the deterrent effect, our criminal investigations have had very limited direct impact on DOD policy. The primary focus of these criminal investigations has been, and will continue to be, proving or disproving allegations of criminal conduct. However, our criminal investigations have identified problems in quality assurance, product substitution, testing and reporting of costs incurred on defense contracts. We have followed up these criminal investigation findings with functionally orientated audits and oversite reviews. The reports flowing from this process have been used to change procurement policy and practice.

We recognized that our criminal investigators have a responsibility to identify management deficiencies and/or systemic programmatic weaknesses during the course of their investigations, as well as evidence of criminal activity. We recognized that identifications of such deficiencies and weaknesses can be used as "lessons learned" to make program and policy changes.

In an attempt to capture such information, I established a Management Control Deficiency Report System. This is a formal system which charges our criminal investigators with the responsibility of identifying defined Material Management Deficiencies and provide reports to the Assistant Inspector General for Audit Followup. Experience has shown that, while our investigators are identifying management deficiencies and systemic weaknesses, they have not been of the magnitude meeting the definitions of Material Management Deficiencies. Reports, with accompanying recommendations for corrective actions, are being provided to appropriate DOD management officials when such deficiencies and weaknesses are found.

As to future actions, and I am speaking of the near future, we are establishing an Analysis, Productivity, and Special Reports Division within the Office of the Inspector General for Investigations. This division will act as a clearinghouse for the receipt, analyses and dissemination of information, both from criminal investigations as I previously discussed, and information from other sources, both from within and from outside the DOD. This division, in addition to other responsibilities, will be responsible for using their analyses to detect how fraud can occur and will make recommendations, at the DOD level, for policy or procedural changes to eliminate conditions which foster weaknesses and opportunity for criminal activity. Acquisition policy and procedures will be one of the primary functional areas for priority analysis.

VOLUNTARY SELF-DISCLOSURE PROCEDURES

Senator **Bingaman**. Please describe in greater detail the voluntary self-disclosure procedures for contractors who admit to defective pricing and cost mischarging. What are the guidelines and procedures for determining when civil and criminal penalties should or should not be used after a voluntary disclosure?

Mr. **Vander Schaaf**. In July 1986, the Deputy Secretary of Defense, concerned with eliminating improper practices in the acquisition process, urged defense contractors to adopt a policy of voluntary disclosure. This program, outlined in enclosure 1, was in addition to the increased emphasis placed on the detection of fraud through the use of investigations and audits. The program was developed in response to an initiative by the defense industry to encourage corporate self-governance and voluntary disclosures.

The Department of Defense (DOD) has encouraged DOD contractors to initiate policies of self-policing and to begin active programs of fraud awareness suited to their particular organizations. Upon receipt of a disclosure, the Office of the Inspector General (OIG) ensures that referral is made to the proper audit and investigative organization. These organizations will seek to verify the disclosure made by the contractor. This verification allows proper decisions to be made regarding the need for criminal and civil prosecution by the Department of Justice (DOJ) as well as the need for suspension and debarment by the DOD. The contractor's past and current efforts to correct deficiencies are of significant importance in determining what remedies the Government should pursue.

Regarding criminal penalties in voluntary disclosure cases, this area is clearly within the prerogatives of DOJ. In sharing our goals for encouraging voluntary disclosure, the Deputy Attorney General has expressed his support in a letter dated February 5, 1987, which is attached as enclosure 2. The DOJ guidelines are contained therein. The OIG and the DOJ realize that, while a broad spectrum of remedies are available to the Government in voluntary disclosure cases, an assessment as to the magnitude of any fraud and the degree of cooperation by the contractor must be made before pursuing a particular course of action.

It should be noted that, with respect to civil penalties, the Civil False Claims Act of 1986 recognizes the value of voluntary disclosure by providing for reduced penalties in appropriate cases.

DEPARTMENT OF DEFENSE PROGRAM FOR VOLUNTARY DISCLOSURES OF POSSIBLE FRAUD BY DEFENSE CONTRACTORS

BACKGROUND

Officials within the Department of Defense (DOD) have been approached by a number of contractors to determine the conditions and agreements that might be structured with the Government if a contractor sought to disclose voluntarily information that might expose the contractor to liability under Federal statutes relating to criminal and civil fraud. From the Department's perspective, the voluntary disclosure of information otherwise unknown to the Government, and contractor cooperation in an ensuing investigation, offers a number of significant advantages: the Government is likely to recoup losses of which it might otherwise be unaware; limited detection assets within the Government are augmented by contractor resources; consideration of appropriate remedies can be expedited by both DOD and Department of Justice when adversarial tensions are relaxed; voluntary disclosure and cooperation are indicators of contractor integrity; and contractors engaging in voluntary disclosure are more likely to institute corrective actions to prevent recurrence of disclosed problems.

REQUIREMENTS ON CONTRACTORS

Department of Defense recognition of a contractor as a "volunteer" will depend on four key factors:

1. The disclosure must not be triggered by the contractor's recognition that the underlying facts are about to be discovered by the Government through audit, investigation, or contract administration efforts or reported to the Government by third parties.
2. The disclosure must be on behalf of the business entity, in contrast to admissions by individual officials or employees.
3. Prompt and complete corrective action, including disciplinary action and restitution to the Government where appropriate, must be taken by the contractor in response to the matters disclosed.
4. After disclosure, the contractor must cooperate fully with the Government in any ensuing investigation or audit.

Defining DOD expectations of "cooperation" in any situation will depend on the individual facts or circumstances underlying the disclosure. However, DOD may enter into a written agreement with any contractor seeking to make a voluntary disclosure where such an agreement will facilitate follow-on action without improperly limiting the responsibilities of the Government. This agreement which may be coordinated with the Department of Justice, will describe the types of documents and evidence to be provided to DOD and will resolve any issues related to interviews, privileges, or other legal concerns which may affect the DOD ability to obtain all relevant facts in a timely manner.

DEPARTMENT OF DEFENSE ACTIONS

If a contractor is recognized as a "volunteer" based on the preceding criteria, the DOD is prepared to undertake the following:

1. Identify one of the Military Departments or the Defense Logistics Agency as the cognizant DOD component to represent DOD for suspension/debarment purposes, i.e., to assess contractor integrity in light of the disclosures. Early identification of the appropriate DOD component will permit the contractor, from the outset of its cooperation, to provide relevant information relating to contractor integrity and management controls, e.g., internal controls, corrective measures, or disciplinary action taken as a result of the information disclosed.
2. The DOD, through the Office of the Inspector General and in cooperation with the Department of Justice, will seek to expedite the completion of any investigation and audit conducted in response to a voluntary disclosure, thereby minimizing the period of time necessary for identification of remedies deemed appropriate by the Government.
3. Advise the Department of Justice of the complete nature of the voluntary disclosure, the extent of contractor cooperation and the types of corrective action instituted by the contractor. As always, any determinations of appropriate criminal and civil fraud sanctions will be the ultimate prerogative of the Department of Justice.

COMMENCING A VOLUNTARY DISCLOSURE

Since initial judgments as to appropriate investigative and audit resources will be necessary in any voluntary disclosure involving possible fraud, the initial contact with the DOD on fraud-related disclosures should be with the Office of the Inspector General.

While the Office of the Inspector General will be the initial point of contact for fraud-related disclosures, other DOD components are expected to be advised or involved as circumstances warrant. Besides the Office of General Counsel, DOD, and the appropriate suspension/debarment authority, other DOD components that expectedly would be advised, or involved, in voluntary disclosures are the Office of the Assistant Secretary of Defense (Acquisition and Logistics) and the Defense Contract Audit Agency.

The Office of the Inspector General element that will serve as the initial point of contact is:

Assistant Inspector General for Criminal Investigations Policy and Oversight, 400 Army Navy Drive, Room 1037, Arlington, Virginia 22202, Telephone: 202-694-8958.

OFFICE OF THE ATTORNEY GENERAL,
Washington, DC, February 5, 1987.

Hon. WILLIAM HOWARD TAFT IV
Deputy Secretary of Defense, U.S. Department of Defense, The Pentagon, Washington, DC.

DEAR WILL: Thank you for your letter of 18 September 1986 describing the voluntary disclosure initiative of the Defense Department. You have my assurance that the Department of Justice fully supports this program and will work with the Department of Defense for its successful implementation.

I am encouraged that many defense contractors are adopting compliance programs and disclosing problems affecting defense contracts. The willingness of contractors to adopt self-policing programs may be required as a constructive product of our joint efforts in uncovering and successfully prosecuting, both criminal and civilly, major contract frauds over the past several years. Your voluntary disclosure programs will further encourage corporate good citizenship.

You express the view that it would be helpful for the Department of Justice to provide guidance on voluntary disclosures. I agree that such guidance would be both useful and appropriate.

As you are undoubtedly aware, it is our practice to take into consideration factors relating to the integrity of a company in assessing whether to bring charges. A voluntary corporate disclosure of wrongdoing is rarely the sole basis for a decision not to prosecute; however, it is one of a number of factors we view as relevant to the charging decision. Others include the strength of the evidence, indicia of *scienter,* level of employee or management involved, pervasiveness of the conduct, dollar impact on the taxpayers, the quality of cooperation during the investigation, the nature of the remedial actions taken in the wake of the discovery of misconduct, and the quality of the company's efforts to prevent misconduct in the first instance by a meaningful compliance program—implemented in fact, as well as recorded on paper.

Clearly, our objective is to bring prosecutions that will have a deterrent impact. At the same time we recognize the desirability of prosecutive judgments, whether at the charging stage, the plea stage, or the sentencing stage of the criminal justice process, which will encourage contractors to initiate compliance programs.

In prosecuting corporations, particularly defense contractors, deterrence is a most significant factor. Through criminal prosecution and punishment, other contractors are put on notice as to the requirements of law and encouraged to modify their behavior to conduct business in an honest and noncriminal manner. Prosecutions of contractor corporations create an incentive for management to establish preventive measures and establish clear standards of right and wrong for their employees.

On the other hand, contractors that make serious and responsible efforts to comply with the law and promptly disclose misconduct should not be discouraged from those practices by inflexible prosecutive policies. In some self-disclosure situations, criminal prosecution of the self-disclosing contractor could undermine our law enforcement objectives and would therefore be inappropriate.

With these general objectives in mind, we will be preparing guidance for our United States Attorneys in the form of a supplement to the United States Attorney's Manual. I will make sure you have a copy of the supplement as soon as it is issued.

On the civil side, the decision whether to pursue a False Claims Act case is governed by many of the same considerations I have just outlined. Of course, we are also interested in attempting to recover the actual funds defrauded from the Government, as well as using the "penalty" provisions of the act to recover funds reflecting other losses to the Government, such as interest and the cost of investigations. As you know, the Congress recently passed and the President signed the False Claims Act Amendments of 1986, P.L. 99-562 (October 27, 1986). Those amendments increase the damages the United States is entitled to recover from double damages to triple damages and the forfeiture amount from $2,000 per false claim to not less than $5,000 and not more than $10,000 per false claim. The amendments specifically provide, however, that if prior to becoming aware of an ongoing investigation into a matter, a person provides appropriate investigating officials with all the information in their possession about the fraud within 30 days of discovery and fully cooperates with the Government's investigation, the court may reduce damages from triple to no less than double. Thus, on the civil side, we have a well defined statutory basis providing not only an incentive to your announced self-disclosure policy, but also appropriate treatment for persons or corporations that promptly disclose wrong-doing and cooperate with the Government.

Apart from the questions of prosecutorial judgment, I believe it is important that the Defense Department coordinate closely with the Justice Department in administering its voluntary disclosure program. Accordingly, we have provided each United States Attorney with a copy of your July 1986 release. In addition, to assure that coordination between our Departments is properly maintained, our Defense Procurement Fraud Unit in the Criminal Division will continue as the contact point to review all voluntary disclosure issues on behalf of the Department of Justice. To assure consistency of decisionmaking, the Defense Procurement Fraud Unit will also have responsibility for making or reviewing prosecutive decisions in cases involving voluntary disclosure by defense contractors.

I hope these remarks provide some guidance for the voluntary disclosure initiative and will aid in a successful self-policing and self-disclosure program for the industry. We look forward to our continued cooperation and success in combatting fraud in defense procurement.

Sincerely,

ARNOLD I. BURNS,
Deputy Attorney General.

AMENDING INSPECTOR GENERAL ACT

Senator **BINGAMAN**. I am the cosponsor on a bill to be introduced by Senator Glenn to amend the Inspector General Act of 1978 to establish IGs in:

Department of Treasury
Federal Emergency Management Agency
Nuclear Regulatory Commission
Office of Personnel Management.

The bill also strengthens the internal audit function in numerous other agencies without creating statutory IG positions and contains some other refinements of the original IG Act. In light of DOD's original opposition to creation of a statutory IG, how would you assess the effectiveness of your office within DOD? Do you recommend the creation of statutory IGs in other agencies or Federal entities that are not covered by the IG Act?

Mr. **Vander Schaaf**. Since 1981, the Department of Defense has initiated the most sustained attack ever on fraud, waste, and abuse in the Department. This attack has included a set of comprehensive audits and investigations unparalleled in DOD history. These audits and investigations have ferreted out numerous problems for public scrutiny and, more importantly, put controls in place to minimize their recurrence. The Office of the Inspector General, DOD has played a significant role in this effort. Since its establishment in 1982, the monetary benefits and cost avoidance identified by IG, DOD, auditors alone have averaged 10 times the cost of supporting the entire IG, DOD organization.

Our audit followup system sets the standard for the Federal Government. We have followed up on over 9,300 agreed-upon IG, DOD, and the General Accounting Office suggestions for savings and management improvements and have documented the achievement of $11.1 billion in savings and cost avoidance.

The Defense Criminal Investigative Service, headed by the Assistant Inspector General for Investigations, is a specialized unit which focuses on white collar crime. Our investigators can be credited with bringing persistent pressure on defense contractors to perform to the letter of the law. We have aggressively pursued cases of fraud in the procurement process. Specific initiatives are outlined in my statement.

We revitalized the DOD Hotline as a vehicle for DOD employees, contractors, and the public to report fraud, waste, and mismanagement. The effectiveness of the Hotline was validated by GAO, and the Hotline currently processes nearly 1,000 calls a month.

We initiated an inspections capability for Defense Agencies and other nonservice DOD components that have never before been subject to inspections. Over 165 entities have been identified for inspection; a functional approach has been instituted to evaluate agency management and compliance with Department regulations and to highlight systemic problems; and cooperative projects have been undertaken combining the resources of inspectors from the military services and the IG, DOD.

My statement includes more detailed information regarding these activities. I believe that these accomplishments are a clear indication of the effectiveness of the Office of the Inspector General, DOD.

With regard to your second question of the creation of statutory IGs in other agencies, I support the creation of statutory Inspectors General in other agencies.

DEFENSE ACQUISITION SYSTEM

Senator **Bingaman**. Mr. Godwin, Secretary Taft has approved your proposal to establish a Defense Acquisition Board (DAB) that will replace the Joint Requirements and Management Board (JRMB) as the Pentagon's review board for large weapons systems.

How will this new board improve the efficiency of the DOD procurement process?

Mr. **Godwin**. The DAB will seek to improve the efficiency of the DOD procurement process by placing renewed emphasis on the issues of "affordability" and whether or not to develop a new system or upgrade an existing one. It will also place more emphasis on examining the cost effectiveness of alternative technical responses to validated operational needs.

Included on the DAB is the V.C. Joint Chiefs and the three Services' Acquisition Executives. These members plus the OSD representative will reduce membership to 10 and will provide means to include all aspects of any subject.

It is also proposed that the DAB conduct milestone review in a more formal manner along business lines and that all matters will be formally acted upon—against clearly delineated issues.

TECHNICAL DATA DEVELOPMENT AT PRIVATE EXPENSE

Senator **Bingaman**. Mr. Godwin, the Department of Defense has recently implemented policies to force defense contractors to invest their own funds in research, development and production as a means of reducing weapons system costs. There are concerns, however, in the defense contractor community that the recent proposed DOD regulations on rights in technical data discourage development at private expense. Has there been any attempt to make policies consistent in this area?

Mr. **Godwin**. The revised technical data regulation is one of the most significant policy revisions that we have made in past several years. It balances the Government's need to encourage innovation and private development for satisfying Government requirements with the sometimes conflicting need to obtain rights in technical data for purpose of competition. Nevertheless, in drafting this regulation, we have been careful to insure that contractors' rights in technical data that result from their own privately funded development efforts are fully protected. For example:

a. Contracting officers have been directed to obtain only such minimum data and data rights as are essential to meet the Government's needs.

b. Contractors may not be required, as a condition precedent to the award of a contract, to sell or relinquish their rights in technical data developed entirely at their own expense.

c. In situations where the development effort has been funded by both the Government and the contractor, large contractors will retain sole access to the commercial market when they have provided over 50 percent of the development costs. Small business may retain sole access to the commercial market with any share of the development costs. In the past, contractors access to the commercial market was not protected whenever the Government had provided any of the development funds.

We believe that these changes to our policy will make privately funded development more attractive to the defense contractor community.

Senator BINGAMAN. Mr. Vander Schaaf, under the Goldwater-Nichols Act, each military department was required to eliminate duplication between the staff of the service Secretaries and the service Chiefs, and to consolidate various functions under the Secretaries. Please compare the consolidation plan of each of the services and comment on the differences among the plans in terms of efficient and effective conduct of audit and inspection function.

Mr. VANDER SCHAAF. Title V of the Goldwater-Nichols Department of Defense Reorganization Act of 1986 (Public Law 99-433) required that sole responsibility for the auditing and inspector general functions within the military departments reside in the offices of the appropriate service Secretaries. The military departments have placed the Auditors General in the offices of the respective Secretaries. The Auditors General will report directly to either the Secretary or Under Secretary of their service. Such an organizational alignment conforms to provisions of the Goldwater-Nichols Act and auditing standards on independence issued by the Comptroller General of the United States. The current alignment should facilitate the performance of the audit function in an independent, effective and efficient manner.

We are unable to comment further at this time since we have not yet performed any audits of this reorganization.

CONSOLIDATION OF INSPECTIONS REGIONAL OFFICES

Senator BINGAMAN. A question has arisen as to the basis and cost-effectiveness of your recent decision to consolidate in Washington the regional offices located in Philadelphia, Atlanta, Chicago, Alameda, Wiesbaden. Would you please comment on the basis for the consolidation, the current status, and the cost of this action.

Mr. VANDER SCHAAF. Proposals for consolidating the Inspections regional offices were considered to be a cost-effective measure for improving management efficiency.

In July 1986, in response to a request from the Investigations subcommittee of the House Armed Services Committee, representatives of the General Accounting Office reviewed the management and regional alignment of our Inspections office. Included in the review was a 1985 study by our office which showed a one time cost for consolidation of $960,000 and a resultant annual savings of approximately $266,275. Based on the GAO review, the subcommittee wrote to the Secretary of Defense recommending consolidation.

Although the study addressed the economic benefits to be derived from consolidation, economics was not the sole criterion on which the final decision was made. Pursuant to the 1982 amendments to the Inspector General Act, our office absorbed the regional offices of the Inspector General, Defense Logistics Agency. This new Department-wide responsibility vastly increased the number of activities in the inspection universe and broadened the scope of inspections to include functional areas of defense management such as property disposal and hazardous material/hazardous waste management. At the same time, the thrust of Inspector General inspections changed from organizational inspections that emphasized noncompliance with DOD policy, directives, and regulations to inspections that give greater emphasis to management improvements and recognition of commendable management activities. The activities and functions of our Inspections office no longer have simple organizational or regional boundaries.

In response to the changing mission, the Inspections office began to perform inspections on a larger scale and in an increasingly diverse arena. After evaluating the significance of the changes, decisions were made to ensure an effective organization in the new environment. Consolidation was one of those decisions. As the inspection thrust, emphasis, and universe changed, the structure, size and location of the Inspections office also needed to change.

Collocated, multiskilled inspection teams offer the Inspector General several advantages over geographically dispersed regional inspection teams in terms of inspector assignments, training, and skills development. Collocation will also allow improvements in quality control, quick reaction capability and resolution of inspection findings.

After reviewing the advantages and disadvantages of the situation, the Deputy Secretary of Defense agreed with my recommendation that the Inspections offices be consolidated.

We are proceeding with our planned consolidation. The detailed consolidation plan has been published. Inspections offices in Wiesbaden, Germany and Philadelphia, PA are scheduled for closure not later than August 31 of this year. Civilian personnel who will be transferred with their function from the Wiesbaden and Philadelphia offices have been identified and commitments made.

Inspections offices in Alameda, CA; Atlanta, GA; and Chicago, IL are scheduled for closure not later than August 31, 1988. Civilian vacancies at all regional offices have been transferred to Washington and an active recruiting program is underway.

A total of forty civilian spaces are being transferred to the Washington area. Their present disposition is: Alameda 7, Atlanta 8, Chicago 11, Philadelphia 8, Europe 6.

The Air Force, Army and Navy have agreed to fill all future officer requisitions in the Washington, DC area. The Air Force and Army have also initiated action to transfer military officers assigned to the Wiesbaden and Philadelphia offices to Washington, DC.

MAJOR BUYING COMMANDS

Senator **Bingaman**. In your testimony, you have noted that some competition advocates for major buying commands lacked independence. Please identify these commands and describe any corrective action that has been taken.

Mr. **Vander Schaaf**. This condition existed at most Army Material Command activities, at the Naval Air Systems Command, Naval Sea Systems Command, and many of the 44 major Navy field contracting activities, the Air Force Systems Command field activities, and the Defense Logistics Agency hardware, fuels, and support centers. The audit process which identified this condition and ensures corrective actions are taken is still ongoing. The final audit report on the Competition Advocacy Program which identified this condition should be published in late April or early May. We will forward a copy to the committee as we do with all of our audit reports. It will be several months after the audit is published before we are sure of precisely what corrective actions the military departments will take.

Senator **Bingaman**. Mr. Vander Schaaf, your testimony notes difficulty created by an example in last year's conference report concerning the definition of "cost and pricing data" for purposes of the Truth in Negotiations Act. Please describe the problems and the impact on DOD.

Mr. **Vander Schaaf**. The intent of Public Law 87-653 must be maintained. The Conference Report for the fiscal year 1987 National Defense Authorization Act cites union agreements as an example of what is not cost and pricing data. This too narrowly defines a complex issue. The Armed Services Board of Contract Appeals has ruled on numerous occasions on what constitutes "cost or pricing" data. Our concern is that the terminology in the Conference Report may limit the Government's course of action. The circumstances of what is cost or pricing data must be analyzed on a case-by-case basis. One must look beyond the description of an item to determine if it is cost or pricing data. We believe the FAR (Federal Acquisition Regulation) definition is sufficient to protect the Government and the contractor interests.

I do not believe that the Conference Committee intended to substitute its judgment for that of a contracting officer, board of contract appeals, or court sitting in judgment with all of the facts before them. Therefore, I believe some form of clarifying statement, perhaps in the Conference Report accompanying this year's DOD authorization legislation, would be helpful in alleviating any possible misinterpretation of last year's Conference Report.

I suggest something along these lines: Cost or pricing data includes the data forming the prospective contractor's judgment about estimated future costs or projections. Cost or pricing data are all the facts that can reasonably be expected to contribute to the soundness of estimates of future costs. They include management decisions or plans that could have a significant bearing on costs.

INDEPENDENT TESTING AND EVALUATION

Senator **Bingaman**. Mr. Krings, your office was established to be an independent testing and evaluation bureau within the Department of Defense. Can you give an example as to why "independence" is needed?

Mr. **Krings**. We are all aware of the DIVAD experience and the rigor and objectivity that our independence brought to that decision process. This environment of vigor and objectivity has been brought to a number of programs where it might not otherwise have existed, most recently the B-1B—although because of the advanced state of this program, our involvement was belated.

An example of the need for independence that is frequently overlooked is in the area of test resource planning and programming. Without the existence of an independent office, charged to review and recommend appropriate budget initiatives for test capability needs, neither the Space System Test Capability needs associated with SDI and NASA, nor the OT&E capability needs associated with all air defense systems engaging in the air/land battle environment would have surfaced as shortfalls or limitations in our test capabilities. Service priorities simply don't allow such issues to surface until they become absolute crises or "show stoppers," and then it's too late.

GAO FINDINGS REGARDING SERVICE REPORTS

Senator **Bingaman**. The GAO report stated that your staff rarely examines raw test data but instead depends almost entirely on the reports submitted by the military services. Therefore instead of independent analyses, the GAO stated your reports are brief summaries of the services' reports. The GAO report also said that you told GAO investigators that your report "should not differ from service test reports." Will you please respond to these GAO findings?

Mr. **Krings**. My office was not structured or staffed to examine "raw" data, and I expect that such activity will be the exception rather than the rule for the future as well. It is not necessary or cost effective for my office to attempt to duplicate the data reduction and analysis capabilities that exist in the services and private industry. Instead, our approach is to provide sufficient oversight over the continuum of a program to assure that adequate testing is being accomplished and the requisite data is being collected and analyzed without any opportunities for or even the appearance of manipulation to allow the critical issues and test objectives approved by this office to be comprehensively evaluated.

There is an apparent misunderstanding on the part of the GAO that this is a two-or-three-event process. On the contrary, on a weekly and sometimes daily basis our oversight activity is a continuous process. We keep our fingers on the pulse of ongoing events, point out any concerns, and resolve associated issues with the services prior to completion of a test. Consequently, we should not differ with the services on "facts" and results of a test. Also, our presence and objectivity should cause service assessments to be very similar to ours, although this may not always be the case. In summary, if we are doing our job properly, we (DOT&E and the services) should be looking at the same findings and, we would hope, reporting out the same or very similar assessments. In other words, we are the check and balance that makes the system work as it should.

ROLE OF CONTRACTOR PERSONNEL IN TESTING PROCESS

Senator **Bingaman**. What is the proper role for contractor personnel in the testing process? Do you see any need for any statutory changes?

Mr. **Krings**. Contractor personnel have a very valid role in a support posture, as the services frequently don't have the technical expertise and in some cases equipment to support a given test event. Their presence is particularly important early on when no hardware or very early preproduction hardware is going through DT&E or early OT&E. Further, in certain emergency situations they may be the only source of recovery information that can save or salvage a test event. On the other hand, during the "final exam" phase of OT&E—what we are coming to refer to as Production OT&E—the system or key subsystem contractors absolutely should not be operating or maintaining the weapon system unless they will perform such roles when the system is deployed.

Data processing is another matter. Frequently, the system contractor is the only one who has (1) the recording equipment or instrumentation tailored to meet that particular weapon system's demands or (2) the necessary software algorithm to reduce the data for analysis. In these instances, the Government must have a data collection and oversight plan that ensures against the possibility of data manipulation.

ELIMINATING DUPLICATION

Senator **Bingaman**. Under the Goldwater-Nichols Act, each military department was required to eliminate duplication between the staffs of the service Secretaries and the service Chiefs, and to consolidate various functions under the Secretaries. Please compare the consolidation plan of each of the services and comment on the differences among the plans in terms of fulfilling the mission of your office.

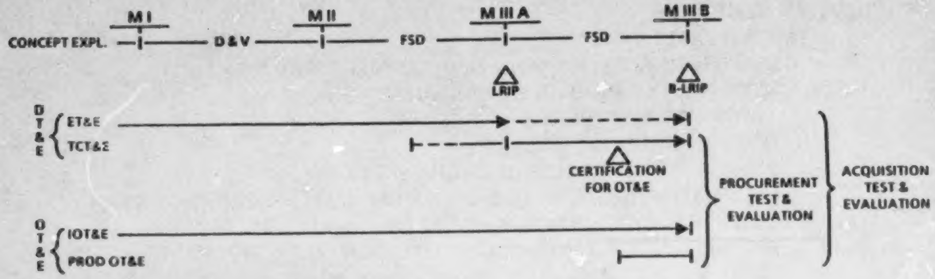
Mr. **Krings**. I think it appropriate that I leave the overall analysis of the service reorganizations, particularly with regard to acquisition management, to the USD(A). I must say, though, having reviewed the announced service reorganization structures, on the testing side I think the services have failed to recognize the importance the Congress has placed on testing. There is no organizationally independent or totally objective test office in the services at the Secretariat level. In all cases, the testing responsibility—both DT&E and OT&E—has been assigned to the service acquisition manager. In one case, the Air Force, the test responsibility has been retained at the service Chief staff level, while the acquisition management structure has been "stacked" on top of it at the Secretariat level.

REORGANIZATION

Senator **Bingaman**. Mr. Krings, you have advocated a reorganization plan which would put the activities and staff of the office of the Deputy Under Secretary of Defense for Acquisition (Testing and Evaluation) under your control. You point out in your statement that engineering testing and evaluation under this plan would remain outside of your control. Your concept cuts across the more traditional use of the terms "developmental" and "operational" testing and evaluation. Could you please explain your understanding of the various types of testing and evaluation and where each falls in your organization proposal?

Mr. **Krings**. I believe it is easier to portray my concept of T&E pictorially. Accordingly, I have attached a graph of the acquisition process and the types of testing I have been discussing. Also provided are "first cut" definitions of this new approach. The bottom line of all this is, first, to focus on the procurement objective—operational effectiveness and suitability—throughout the entire T&E process; and, second, to allow testing the freedom (without a pass/fail threat) necessary to provide the early and continuous feedback required by the developer to aid him in achieving that procurement goal.

T&E IN THE ACQUISITION PROCESS -- A NEW LOOK


M I
M II
M III A
M III B
CONCEPT EXPL.
D & V
FSD
FSD
LRIP
B-LRIP
DT&E
ET&E
TCT&E
CERTIFICATION FOR OT&E
PROCUREMENT TEST & EVALUATION
ACQUISITION TEST & EVALUATION
OT&E
IOT&E
PROD OT&E

D&V = DEVELOPMENT & VALIDATION
FSD = FULL SCALE DEVELOPMENT
LRIP = LOW RATE INITIAL PRODUCTION
B-LRIP = BEYOND LRIP
DT&E = DEVELOPMENT TEST & EVALUATION
ET&E = ENGINEERING TEST & EVALUATION
TCT&E = TECHNICAL COMPLIANCE TEST & EVALUATION
IOT&E = INITIAL OPERATIONAL TEST & EVALUATION
PROD OT&E = PRODUCTION OPERATIONAL TEST & EVALUATION

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DEFINITIONS

- DEVELOPMENT T&E
  - DEMONSTRATES THAT:
    - ENGINEERING DESIGN AND DEVELOPMENT ARE COMPLETE
    - DESIGN RISKS HAVE BEEN MINIMIZED
    - TECHNICAL SPECIFICATIONS ARE MET
  - INCLUDES ENGINEERING T&E
    - SUPPORTS THE MATURING ENGINEERING EFFORT
    - VERIFIES TECHNOLOGIES AND IDENTIFIES TECHNICAL PROBLEMS
  - INCLUDES TECHNICAL COMPLIANCE T&E
    - PROVES SYSTEM MATURITY (MEETS CONTRACT SPECS)
    - CERTIFIES READINESS FOR PRODUCTION OT&E

- OPERATIONAL T&E
  - EXAMINES OPERATIONAL EFFECTIVENESS AND SUITABILITY
  - BEGINS EARLY IN DEVELOPMENT CYCLE
  - INCLUDES INITIAL OT&E
    - USED TO FORECAST OPERATIONAL EFFECTIVENESS AND SUITABILITY
    - MAY USE DT&E RESULTS, MODELS AND SIMULATIONS, PROTOTYPES, PREPRODUCTION ARTICLES, ETC.
  - INCLUDES PRODUCTION OT&E
    - DETERMINE OPERATIONAL EFFECTIVENESS AND SUITABILITY
    - SUPPORTS B-LRIP DECISION AS REQUIRED BY TITLE IO, U.S. CODE, § 138

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Senator **Bingaman**. Under your proposal, you would retain your independence and report directly to the Secretary of Defense. However, last year we clearly placed the management of developmental testing under the Under Secretary of Defense for Acquisition. Would any legislative changes need to be made in order to implement your proposal?

Mr. **Krings**. I don't believe any significant changes are needed because the USD(A) should have authority over DT policy. I believe a fine tuning that gives me the authority to propose all test policy with DT&E policy subject to the final approval of the USD(A) would place everything in proper order.

Senator **Bingaman**. You have proposed using testing as a means of controlling a system's movement through the various phases of the acquisition process. How would you accomplish this? How do you answer the critics who feel that such a proposal might merely erect additional obstacles in an already obstacle-ridden acquisition process? Wouldn't we run the risk of having such testing hurdles used for further congressional micromanagement of systems acquisition?

Mr. **Krings**. Certainly, the micromanagement problem you raise is always something to be concerned about. However, you have made my office your agent, and I think you must give me the latitude to perform in that capacity throughout the process and judge the results, as you do now, at the end of the acquisition. My "procurement controlled by testing" proposal would establish thresholds and dates to be achieved throughout the development process. Through program-tailored reviews, testing would assure that the system was progressing satisfactorily toward procurement of operational effectiveness and suitability. As a result, the IOC and the production decision would be based on demonstrated achievement rather than a political established set of dates.

LIVE-FIRE TESTING

Senator **Bingaman**. Last year, the authorization bill included a provision requiring live-fire testing. Would you comment on the merits of that legislation, especially as it relates to contractor involvement in operational tests and the requirement to fire munitions likely to be encountered in combat at each covered system prior to proceeding beyond initial low-rate production?

It seems that we may be spending more funds for destroying hardware while increasing the length (and therefore the cost) of major system acquisition.

Mr. **Krings**. First, with regard to contractor participation in OT&E, contractor personnel have a very valid role in a support posture, as the services frequently don't have the technical expertise and in some cases equipment to support a given test event. Their presence is particularly important early on when no hardware or very early preproduction hardware is going through DT&E or early OT&E. Further, in certain emergency situations they may be the only source of recovery information that can save or salvage a test event. On the other hand, during the "final exam" phase of OT&E—what we are coming to refer to as Production OT&E—the system or key subsystem contractors absolutely should not be operating or maintaining the weapon system unless they will perform such roles when the system is deployed.

Data processing is another matter. Frequently, the system contractor is the only one who has (1) the recording equipment or instrumentation tailored to meet that particular weapon system's demands or (2) the necessary software algorithm to reduce the data for analysis. In these instances, the Government must have a data collection and oversight plan that ensures against the possibility of data manipulation.

On the live-fire issue, I think we must proceed with caution. First, the notion of survivability has become somewhat confused. I offer the following definition of the term "survivability" from the Test and Evaluation Master Plan Guidelines (DOD 500.3-M-1, October 1986) to clarify that point:

"*Survivability.*—The capability of a system to avoid or withstand man-made hostile environments without suffering an abortive impairment of its ability to accomplish its designated mission."

In light of this definition, it is clear that the legislation was focused primarily on vulnerability, that aspect of survivability testing that examines the weapon system after it has been hit. Since perhaps the most important aspect of a weapon's survivability is its ability to avoid that circumstance, we need to consider the broader picture and evaluate the weapon in the proper context. If the weapon system is designated to evade or confuse the enemy, vulnerability becomes a secondary concern. Survivability is a quality that must be evaluated for adequacy in the context of the overall test plan.

ON-SITE TESTING

Senator **Bingaman**. In response to the recent GAO report criticizing the lack of involvement of your office in on-site testing, you attributed the weaknesses to lack of staffing. Are there any other actions you are taking or could take to improve your coverage of testing with your current staff resources?

Mr. **Krings**. Yes. We are expanding our use of contract agents, and we are requiring service operational test agencies to brief at Secretarial Program Reviews, where they had not heretofore been required. I believe these actions will result in test activity being visible to both my office and to the ultimate decision makers. Also, with the 12 additional personnel authorizations I've been provided, I will be able to get more people into the field, and I plan to establish small regional offices whose primary responsibility will be test observation.

Questions Submitted by Senator Alan J. Dixon

EXTENDED CONVENTIONAL CONFLICT

Senator **Dixon**. Mr. Godwin, the basic objective of Defense budget requests over the years is to obtain adequate funds that will provide a credible defense structure that will assure the security of our Nation. A key element of this defense structure is the ability of the U.S. industrial base to sustain our military forces in a conventional conflict of extended duration. In your opinion, can the U.S. defense industrial base, in its present condition, sustain our military forces in an extended conventional conflict?

Mr. **Godwin**. The question is difficult to answer in an unequivocal fashion because of the wide range of circumstances by which the U.S. could become involved in an extended conventional conflict. Whether the U.S. industrial base could sustain our military forces would hinge upon issues such as the amount of warning time available to turn on the base and the length and intensity of the conflict.

These issues are imbedded in the way we perform mobilization planning. Throughout most of our history, with a hiatus during the 1960s and early 1970s, national security policy and strategic planning have been based fundamentally upon mobilization war potential. This focus was reaffirmed by President Reagan in NSDD 47, Emergency Mobilization Preparedness, dated March 22, 1982. The U.S. mobilization system and process is designed to reinforce the deterrence role of our large standing force and sustain combat if deterrence were to fail. Accordingly, the Department of Defense has developed mobilization plans and programs to bring the peacetime force and war reserve stocks to wartime authorized levels and to expand the standing force as necessary. Regarding warning, it is policy that we and our allies must be prepared to respond to highly ambiguous warning indicators. This capability will help avert crises by reinforcing deterrence and also help ensure that the industrial base can respond to emergency sustainment needs.

In the event deterrence fails, any war involving the U.S. and Soviet forces would have the potential of escalating to a world war. However, an initial conflict could very well begin in a localized way. The United States would then attempt to keep the war contained and at the lowest level of violence consistent with protecting our vital national interests. Our long term objective is to be able to sustain conventional conflict for as long as the enemy can sustain this mode of warfare.

Because of uncertainties of potential demand and concern regarding the condition of the industrial base, we have undertaken an Industrial Base Initiative which will examine the policy and program levers available to DOD to enhance the industrial base.

Senator **Dixon**. With the recent initiatives to reduce or eliminate medium range nuclear missiles in Europe it will be of paramount importance that we have sufficient conventional forces that could prevail in the event of conflict. The U.S. industrial base would be required to "surge" and sustain these forces for an extended duration. In the fiscal year 1988/89 budget request are adequate funds allocated to those programs that will assure responsiveness of our industrial base? If not, why not?

Mr. **Godwin**. U.S. military capability is built upon the so called four pillars: force structure, modernization, readiness and sustainability. All are essential elements of a military force capable of engaging and prevailing in a conventional conflict. The fiscal year 1988/89 budget request is a carefully crafted program which balances the needs of each of these essential pillars. In our view, the request provides the best capability for the United States to deter war and, coupled with mobilization planning just discussed, to fight an extended conventional conflict if necessary.

MANUFACTURING TECHNOLOGY PROGRAM

Senator **Dixon**. The DOD Manufacturing Technology Program has a good track record over the past 25 years in the improvement of the efficiency of our defense industrial base. However, funding requests for this program have shown sharp decreases in the last 5–6 years.

Do you consider the request in the fiscal year 1988/89 budget adequate, considering the high cost of manufacturing problems that we are experiencing on our military systems today?

Mr. **Godwin**. The ManTech program has been funded at about $200 million per year (in constant 1987 dollars) for the past several years with a couple of exceptions.

[Millions—1987 dollars]

	Fiscal years—					
	1982	1983	1984	1985	1986	1987
ManTech Program	244	151	223	203	205	124

Congress reduced the budget in fiscal year 1983 after a controversy developed over whether the ManTech program should be moved to the R&D appropriation from the procurement appropriation where it had been funded for over 20 years. The initial congressional reduction was even larger but some funds were finally restored. The ManTech program is now entirely funded from the R&D appropriation.

The fiscal year 1987 reduction is primarily the result of the Army limiting ManTech investments to the needs of in-house facilities.

The fiscal year 1988/89 ManTech budget request represents an effort to balance the overall needs and priorities of the Department of defense. Recent requests from industry may, in fact, exceed the budgeted amounts.

Senator **Dixon**. I understand that the Army has ceased to follow DOD direction in the implementation of this program (ManTech). They no longer fund projects that involve defense contractors and presently limit the program to "in-house" installations such as arsenals, etc. The Navy and the Air Force are following the directives of the Secretary of Defense in implementing this program.

Why do you think the Army has been permitted to follow this singular course of action?

Mr. **Godwin**. The Army action is the result of philosophical differences concerning how manufacturing technology investments should be funded—by DOD or by our contractors. While there is no absolutely correct answer to the question, a consistent application of a single philosophy over a period of time is needed so that individuals and companies in the system can plan accordingly. It remains to be seen whether or not the Army's approach will result in a long-term positive impact on the Army's acquisition and readiness programs.

SUB-TIER MANUFACTURERS

Senator **Dixon**. Does our current procurement policy affect the ability of our domestic sub-tier manufacturers to compete?

Mr. **Godwin**. In its acquisition of weapon systems and equipment, the Department of Defense contractual relationship is essentially with prime contractors and not the sub-tier manufacturers who supply the primes. In general, procurement policy that governs the basic business dealings with prime contractors also applies to the sub-tier although various aspects of the policy may or may not directly flow down.

We are aware of no aspect of current procurement policy that adversely affects the ability of the sub-tier manufacturers to compete. In our continuing consideration of policy, however, we are mindful of the importance of the sub-tier manufacturing base to our defense posture. In those instances of specific problems arising which have a negative impact upon sub-tier producers, active solutions are sought to ensure their continuing health. A recent example is the action taken to ensure that technical data rights would be retained by sub-tier producers in their relationships with prime contractors and the Government.

UNFAIR FOREIGN TRADING PRACTICES

Senator **Dixon**. How much effect does unfair trading by foreign firms have on the defense industrial base? How much unfair trading would you estimate takes place?

Mr. **Godwin**. To the extent that they occur, unfair foreign trading practices affect the entire U.S. industrial base, not just the defense portion. When unfair practices are identified, existing U.S. trade legislation provides a variety of remedies such as countervailing and antidumping duties. No estimates of the exact extent or impact of unfair trading practices are available, however, the U.S. Trade Representative has cataloged the various foreign unfair practices in a report to Congress, the National Trade Estimate: 1986 Report on Foreign Trade Barriers.

INDUSTRIAL COMPETITIVENESS

Senator **Dixon**. What can the Government do, short of subsidizing companies, to encourage the growth of sub-tier contractors and to make them competitive in the domestic and global economies?

Mr. **Godwin**. The sub-tier and basic industries which are essential to national security include a broad range of types of industries, such as forgings, castings, bearings, semiconductors in the sub-tier category and steel, petrochemicals, metals, composite fibers in the basic category. The level of defense demand varies widely, from the very low take from most industries in peacetime to the very high demand that would occur in war situations.

The first point to be made about the competitiveness of industry essential to the production of defense goods is that it is a national problem which requires national solutions. In most cases, problems of competitiveness for a particular industry cannot be solved within the scope of Department of Defense policies, programs and resources. The second point is that the national solutions for U.S. industrial competitiveness require broad-based fundamental changes. According to the President's Commission on Industrial Competitiveness, fundamental improvements must be made in the general areas of technology, capital resources, human resources and the trade environment.

The President's Competitiveness Initiative addresses these fundamental issues in its six-part program. The six elements are: (1) increasing investment in human and intellectual capital; (2) promoting the development of science and technology; (3) better protection of intellectual property; (4) enacting essential legal and regulatory reforms; (5) shaping the international economic environment; and, (6) eliminating the budget deficit. The specific proposals of each of these programs provide a solid prescription for action by the Government to make essential defense industry competitive in the global economy.

Senator **Dixon**. What can the private sector do to encourage their growth? Does management in the private sector need redirection in order to accomplish this growth?

Mr. **Godwin**. The essential role of the Government is to create a broad-based economic and regulatory environment in which U.S. companies can prosper, create jobs and compete in the changing global economy. The role of the private sector, given a favorable environment, is to take all those essential and long term actions necessary to make themselves globally competitive. This would include actions such as investment in R&D, new process technology, and productivity enhancing capital equipment and providing a management focus on the manufacture of quality goods at a competitive price.

Regarding redirection, there are indications that many U.S. firms, particularly multinational companies, have pursued business strategies which are not necessarily in the national interest as opposed to a narrower corporate interest. One aspect of this is the allegation that creation and retention of U.S. jobs has become a lower priority than corporate profit and viability. Choice, and, in some cases, economic necessity, has led many U.S. companies to offshore manufacturing strategies which has been described as the hollowing of American industry. A frequently cited element of the broad problem of competitiveness is the short-term profit view of many U.S. firms, as contrasted with the much longer term strategy of many of our global competitors.

If a sub-tier and basic industrial structure essential to national security is to be retained and enhanced, some management redirection in the private sector may be required. It can only come about, however, if the fundamental causes of misdirection are identified, commonly understood and addressed in a cooperative way by the Government, industry, academia and labor.

Senator **Dixon**. What department or departments of Government do you see as being most capable, potentially, of address the problem with our industrial base?

Mr. **Godwin**. Given the breadth of the fundamental problems and potential solutions, as indicated by the scope of the President's Competitiveness Initiative, it is clear that no one executive department has the full range of capability and responsibility required to address the industrial base issue. Many departments have a role, to include Commerce, Treasury, Labor, Justice, Interior, Transportation, the U.S. Trade Representative and others. The two departments most involved in this matter are Commerce and Defense. Commerce because of the breadth of the industries and Defense because of its need to maintain the defense industrial base and also the volume of its acquisitions—some 80 percent of total. Moreover, an effective cooperation between the executive branch and Congress is an essential requisite to achieving practical and fundamental solutions which will lead to a restoration of U.S. industrial competitiveness.

STRATEGIC AND CRITICAL MATERIALS STOCKPILE

Senator **DIXON**. How can the strategic and critical stockpile be made more capable of answering our potential defense needs?

Mr. **GODWIN**. The Strategic and Critical Materials Stockpiling Act requires that a national defense inventory of strategic and critical materials be acquired and retained to preclude dependence on foreign supply sources in times of national emergency.

The growth of high technology has altered the various military threat environments faced by deployed forces. Fundamentally, threat environments, weapon systems, the domestic industrial base, and materials used in defense have been in a constant state of change over the past 40 years; the rate of change is increasing. International industrial interdependency has added to the complexity. And, the United States has changed from a mass production society to an economy which is devoted to services by an enormous 70 percent. A national defense stockpile needed 40 years ago when the domestic industrial base was in an expansion mode is different than a stockpile needed today with the base in a diminishing mode.

The range of defense industrial need for a national defense stockpile during national emergencies is also different. During World War II and the Korean conflict, the concept of a stockpile was to provide a secure source of industrial raw materials to suppliers to process, so fabricators and subcontractors could provide parts and components needed to manufacture weapon systems and to maintain basic and essential industries. Although this concept is still important, the United States is moving away from a basic materials-intensive society. Whereas the stockpile was an insurance foundation of fundamental raw materials upon which the industrial base could rely, today's need is increasingly focused on selective applications throughout the various tiers of manufacturing to make up for lost capacities in order to support surge of the weapon and equipment production lines which will exist at the time of national emergency.

Therefore, as proposed by the President, national stockpile planning for strategic and critical materials must be updated and synchronized with military strategy, technological changes and industrial modernization to meet current defense needs. We look to improve our national defense stockpile assets and methods to meet the needs of current defense strategy and the new and emerging weapon systems and equipment.

QUESTIONS SUBMITTED BY SENATOR PHIL GRAMM

INDUSTRIAL BASE

Senator **GRAMM**. Mr. Godwin, recent DOD profit and finance policies have attempted three goals: greater assumption of financial risk by defense contractors; lower outlays for defense procurement, and greater productivity investment by defense contractors. Is anyone in your office measuring the impact of these changes on the health of the defense industrial base, especially the second- and third-tier subcontractors?

Mr. **GODWIN**. The health of the United States defense industrial base is of the utmost concern and importance to the Department of Defense. We do an ongoing assessment of the impact of these and other laws, policies and regulations on the defense industrial base and are attempting to strengthen the industrial base at all tiers. We understand that the Congressional Budget Office is currently conducting an assessment of some of the more recent changes which impact the industrial base.

ACQUISITION POLICY

Senator **GRAMM**. Mr. Godwin, you have placed great emphasis in your statement on the recent changes you have implemented to bring the defense systems acquisition management under the greater control of your office. More coordinated management of systems acquisition was a major reason for the creation of the position which you now occupy. However, coordination of acquisition policies issued by the services was also a major reason for the existence of your office. What mechanisms have you established or are you establishing to control the issuance of acquisition policies independently by the services?

Mr. **Godwin**. The Federal Acquisition Regulation and the Department's Supplement comprise uniform acquisition policies which are followed by the Department. The Defense Acquisition Regulatory Council reviews requests for waivers and deviations and approves or disapproves them as appropriate. In addition, the Defense Acquisition Board monitors service acquisition policies as they are applied to major acquisitions. As a result, I plan to request a thoughtful analysis and evaluation to ensure that the stated policy and its application at the service level are consistent with departmental guidelines.

DUPLICATE REQUESTS FOR CONTRACTOR RECORDS

Senator **Gramm**. In my travels around the country, I have been approached by defense contractors who are very concerned about the recent upsurge in the number of DOD personnel who review the operations in their plants. These oversight personnel often appear to be uncoordinated with one another and often make expensive, time-consuming and duplicative requests for contractor records. I am looking into different proposals to remedy this problem, including requiring some review and clearance process within the Department of Defense to reduce the amount of record requests in contractor's plants. Last year, the House and Senate conferees inserted language in the statement of managers accompanying the DOD Authorization Act directing your office to do a better job in this area. What actions have you taken in this area? Do you feel that a review and clearance approach, which would not require any new legislative authority, would be useful?

Mr. **Godwin**. We are coordinating with the DOD IG to eliminate duplicative reviews. Management recommendations from a recent IG report have been implemented. In addition, we are conducting a survey to determine if any further changes such as a clearance approval would be appropriate. We do not see a need for any legislation.

LEGISLATIVE CHANGES

Senator **Gramm**. One frequent complaint we hear from the services and DOD is the level at which Congress has micromanaged the defense acquisition process through a torrent of new, very detailed legislation. Do you have a list of legislation which you believe prevents you from efficiently acquiring goods and services for the Department of Defense?

Mr. **Godwin**. In recent weeks, at my encouragement, various elements within the military departments and defense agencies have informally suggested over 100 changes to the statutes affecting DOD procurement, changes intended to streamline and improve the Defense acquisition process. The suggestions range from minor legislative refinements to major alterations in acquisition law, and reflect a variety of priorities. We are currently working with the services and Defense agencies to organize these proposals, and some others, into a coherent legislative agenda, focusing on those ideas that appear to have merit and a reasonable probability of improving the overall acquisition process.

Senator **Gramm**. When could you get a list behind which your office is prepared to stand to us for review?

Mr. **Godwin**. As soon as we develop that agenda, we will submit our recommendations for review within the executive branch and clearance by the Office of Management and Budget, and then forward them for your consideration.

CURRENT NEGOTIATING PROCESS

Senator **Gramm**. Mr. Vander Schaaf, in your statement, you state that our current negotiating process does not take into effect the efficiency factor. The new profit guidelines focus on investment in assets as the indicator of contractor productivity. How should we broaden the profit guidelines to take into account other measures of productivity and efficiency? How can these be quantified for the purposes of using weighed guidelines?

Mr. **Vander Schaaf**. I believe that the next big challenge for us in fighting waste in Defense acquisition centers on the question of production efficiency. Our whole approach in the past has been one of paying 10–20 percent profit on a cost base which is supported by prior experience, regardless of whether or not that experience was efficient or inefficient. I am talking here primarily about large, negotiated contracts where there is limited or no competition. This environment is a negative incentive. In such an environment, a contractor has an incentive to keep costs high. What we should be doing is discriminating against the inefficient contractors and rewarding the efficient contractors with profit. The challenge is to know the difference between the two types of contractors. Work measurement systems, should cost studies including reviews of the contractors methods and procedures along with hard hitting and challenging reviews of overhead are the key elements.

Good work measurement systems, based on engineered labor standards, produce realization factors which are excellent indicators of a company's utilization of its direct labor. When coupled with should cost studies, which indicate the extent to which the company is using the most efficient methods and operations, and overhead cost reviews, which tell us the appropriateness of the company's loading of direct labor, a good indication of the company's production efficiency can be obtained.

An important step toward being able to determine a company's production efficiency is adoption of the recommendations we made to the Department in our Work Measurement Systems and Engineered Labor Standards final report. I am supporting administrative rather then legislative action to implement our recommendations.

CONTRACT AUDIT FOLLOWUP

Senator **Gramm**. Mr. Vander Schaaf, on page 22 of your statement, you claim that in the 5 years since the establishment of the contract audit followup program that "Contracting officer's authority has not been destroyed. Auditors are not running the procurement process." This claim runs counter to a great deal of testimony our committee has heard over the last 3 years with respect to the increasing insertion of the auditors into the contract negotiation process and the resulting erosion of the contracting officer's authority. What is your view of these concerns?

Mr. **Vander Schaaf**. My view, in very forthright terms, is that such concerns are both unfounded and misguided. As indicated in my statement, the contract audit followup program makes both contracting personnel and auditors more accountable and has introduced into the system such commonsense elements as proper documentation of the disposition of audit recommendations, higher level review of significant issues, and emphasis on timely action. The results speak for themselves. Contract audit issues are being settled more promptly, with higher degrees of sustention by contracting officers of audit positions and costs questioned. The following data on significant, post-award contract audit report illustrates these advances:

	Number of reports closed	Percent of costs questioned sustained
Fiscal year:		
1984	2,207	50.2
1985	2,686	54.6
1986	2,845	68.0

In June 1984 the Office of the Assistant Secretary of Defense (Acquisition and Logistics), my staff, and the Defense Manpower Data Center collaborated on a survey of DOD contracting officers to find out whether they felt their authority had been significantly "eroded" by the contract audit followup effort. Responses from over 2,000 contracting officers indicated that few feared such erosion or had experienced serious workload increases because of the program. Both that survey and a later study by my office also showed that only 4 to 8 percent of audit reports had to be referred to designated review officials because of unresolved disputes, and those officials were agreeing with the contracting officers in most instances. (I would point out that those DOD components with business clearance procedures already required such reviews even before the contract audit followup program existed.)

Finally, I note that critics of the contract audit followup effort usually cite the increased DOD emphasis on auditor attendance at negotiations and the decision to place primary responsibility for determining overhead rates with the DCAA. In fact, neither of those initiatives are part of the contract audit followup program. This illustrates again that the criticism of the program is off target. (In so saying, however, I do not want to imply that I do not support those initiatives on their own merits. On the contrary, I believe both of them are highly constructive, useful measures.)

TRUTH IN NEGOTIATIONS ACT

Senator **Gramm**. Mr. Vander Schaaf, you point out the difficulty caused by the discussion in last year's Authorization bill with respect to the definition of judgmental data under the Truth in Negotiations Act. Do we need legislation to correct this problem, or can it be corrected with committee report language?

Mr. **Vander Schaaf**. The intent of Public Law 87-653 must be maintained. The Conference Report for the fiscal year 1987 National Defense Authorization Act cites union agreements as an example of what is not cost and pricing data. This too narrowly defines a complex issue. The Armed Services Board of Contract Appeals has ruled on numerous occasions on what constitutes "cost or pricing" data. Our concern is that the terminology in the Conference Report may limit the Government's course of action. The circumstances of what is cost or pricing data must be analyzed on a case-by-case basis. One must look beyond the description of an item to determine if it is cost or pricing data. We believe the FAR (Federal Acquisition Regulation) definition is sufficient to protect the Government and the contractor interests.

I do not believe that the Conference Committee intended to substitute its judgment for that of a contracting officer, board of contract appeals, or court sitting in judgment with all of the facts before them. Therefore, I believe some form of clarifying statement, perhaps in the Conference Report accompaning this year's DOD Authorization legislation, would be helpful in alleviating any possible misinterpretation of last year's Conference Report.

I suggest something along these lines: Cost or pricing data includes the data forming the prospective contractor's judgment about estimated future costs or projections. Cost or pricing data are all the facts that can reasonably be expected to contribute to the soundness of estimates of future costs. They include management decisions or plans that could have a significant bearing on costs.

DUPLICATION OF OVERSIGHT

Senator **Gramm**. Mr. Vander Schaaf, in your statement you make reference to an Inspector General review that revealed duplication of oversight at contractors facilities. I am exploring one concept for reducing this duplication through the establishment of a review and clearance process within the Department of Defense. Is this a fruitful approach?

Mr. **Vander Schaaf**. Yes. Your concept is very similar to the actions recommended in our Report on the Survey of Department of Defense Oversight of Contractors' Operations dated December 20, 1985. In that report, we recommended that the Assistant Secretary of Defense (Acquisition and Logistics) direct contract administration offices to exercise increased controls over requests by external DOD oversight organizations for access to contractors' records to assure that the requested information is not readily available from another DOD organization. We would be pleased to work with you or the committee staff in this effort.

In response to our recommendation the defense Acquisition Regulatory Council has opened a case (Number 86-14) to amend the Defense Supplement to the Federal Acquisition Regulations (DFAR). Final drafting of the DFAR revision is now comtemplated for May 1987. Before proceeding with legislation or committee report language, you may wish to determine the exact wording of the subject DFAR revision. This may negate the need for legislative action.

Regarding a contractor plant level review and clearance process, the cognizant administrative contracting officer (ACO), rather than the corporate ACO, should be the focal point for screening of external oversight visits to a contractor's plant. The use of the corporate ACO is not practical because of the limited number of such individuals. While ACOs are located at most larger contractors facilities, corporate ACOs are located at the headquarters of a few of the major defense contractors.

Question Submitted by Senator Strom Thurmond

Senator **Thurmond**. Mr. Godwin, one of the initiatives you had planned in your new position was to have top procurement officials in each military service report to you rather than the individual service Secretaries. This would have eliminated the Secretaries from the acquisition hierarchy and hopefully increase the efficiency of the Department of Defense's procurement process.

Since Deputy Defense Secretary Taft has rejected this proposed initiative, what impact will this have on your ability to obtain a uniform acquisition system and improve the efficiency of the DOD procurement process.

What loss of control and management gains have you lost by Secretary Taft's decision?

Mr. **Godwin**. The proposal for the Defense Acquisition Executive to exercise direct line authority over the Service Acquisition Executives was not approved because the General Counsel of the Department of Defense advised that such an arrangement would be inconsistent with the statutes which establish the service Secretaries as the heads of their military departments. I believe that the USD(A) authority identified in DODD 5134.1, along with the support provided by Secretary Weinberger, should help to increase uniformity and efficiency of the DOD acquisition system.

Questions Submitted by Senator Peter Wilson

PROGRESS PAYMENT REDUCTIONS

Senator **Wilson**. Mr. Godwin, the Continuing Resolution gives you the authority to exempt the ship repair industry from the progress payment reduction otherwise mandated. Why have you not acted to grant this exemption?

Mr. **Godwin**. The authorization given to the Secretary for exempting certain categories of contracts from progress payment reductions was for shipbuilding contracts. The Navy does not consider ship repair contracts to be included in this category and, therefore, has already taken steps to modify the progress payment rate contained in Master Agreements for Repair Alteration of Vessels. With regard to shipbuilding contracts, a decision is pending approval of the Secretary.

SPECIAL TOOLING AND TEST EQUIPMENT

Senator **Wilson**. The regulations dealing with contractor purchases of production special tooling and test equipment permit the services to require contractor investments of any amount from 50 to 100 percent of the tooling and test equipment. Why didn't you provide guidance to ensure that the contractor funding requirements were imposed uniformly?

Mr. **Godwin**. Our implementation of the law requires contractor investment of any amount from 50 to 100 percent of the special tooling and test equipment. We left maximum flexibility allowed by law to suit the specific situation.

PROFIT ON SPECIAL TOOLING AND TEST EQUIPMENT

Senator **Wilson**. The special tooling regulations also provide no guidance on profit allowed on tooling investments and very little on how contractors would be indemnified as the law provides. Why weren't the services provided uniform guidance in each of these cases?

Mr. **Godwin**. Our guidance allows contracting officers to establish profit objectives based upon the specific requirements in each case. It also provides uniform guidance with respect to indemnification.

ACQUISITION POLICY

Senator **Wilson**. Another curious example of the lack of uniformity is in the Navy's policy requiring the use of fixed price-type contracts for full scale engineering development. Over the years, through the wasteful history of total package procurement, we learned that fixed price-type contracts are generally unsuitable for development work. Now the Navy has a policy to require that mistakes of the past be made again. Why haven't you taken steps to bring their policy into line with the rest of the Departments?

Mr. **Godwin**. The Navy's policy as stated in its Instruction requires programs to remain in advanced development until risks are reduced sufficiently to contract for full scale development and production options at firm ceiling prices. We will be reviewing the application of this policy for consistency with departmental guidelines and to ensure that fixed price type contracts are used when they are in the best interests of the Government. I personally doubt that fixed pricing R&D or pre-engineered equipment is a very sound way to contract. I also doubt whether you will see fixed pricing of R&D work by the DOD in the future.

Senator **Bingaman**. We will hope to stay in close touch with you as we move ahead. Thank you.

[Whereupon, at 5:53 p.m. the subcommittee adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEARS 1988 AND 1989

THURSDAY, APRIL 9, 1987

U.S. SENATE,
SUBCOMMITTEE ON DEFENSE INDUSTRY AND TECHNOLOGY,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

DOD IMPLEMENTATION OF RECENT CHANGES IN ACQUISITION POLICY

The committee met in open session, pursuant to notice, at 2:45 p.m., in room SR-256, Russell Senate Office Building, Senator Jeff Bingaman (chairman) presiding.

Present: Senators Bingaman and Nunn.

Staff present: Arnold L. Punaro, staff director; Andrew S. Effron, counsel; Gerald Bankus, Jonathan L. Etherton, professional staff members; Kathleen McGuire, staff assistant.

Also present: Edward McGaffigan, assistant to Senator Bingaman; Charles Smith, assistant to Senator Dixon; James Sayer, assistant to Senator Wirth; Alan Ptak, assistant to Senator Gramm; and Samuel Routson, assistant to Senator Symms.

OPENING STATEMENT BY SENATOR JEFF BINGAMAN

Senator BINGAMAN. Why don't we begin.

Today we continue our hearings on the Department of Defense acquisition policy. At the first hearing on this subject, March 31, witnesses from DOD and GAO gave us detailed reports on the implementation of recent changes.

We had a lively interchange on the authority of the Under Secretary of Acquisition, and we had a most interesting discussion on the merits of combining developmental and operational testing, including testimony from Senator Pryor.

In the course of discussing audit and oversight, we also received testimony about some promising efforts to reduce duplicative demands on contractors for information. We'll continue to monitor DOD efforts to better coordinate its oversight, hopefully with a view toward reducing the regulatory burden on the industry.

From the testimony that we received at the first hearing, it's clear that implementation of recent reforms is largely incomplete, and with respect to most of last year's congressional initiatives, DOD is still in the stage of writing regulations, either at the OSD or military department level.

With respect to recent changes that had been implemented, such as the competition in contracting act, our witnesses generally noted that it's too early to make a definitive assessment of the impact of these changes.

There's been a great deal of talk, both within the Government and within industry suggesting that the procurement system presently is suffering from a regulatory overload as a result of the number and scope of recent legislative and regulatory changes.

It could be argued that Congress and DOD should concentrate on implementation, and forego further statutory activity until a more complete assessment of the recent changes can be made.

However, there may be room for fine-tuning or removal of readily identified and agreed upon impediments to sound procurement practices.

At the March 31 hearing, we learned that DOD is in the process of identifying regulatory and legislative changes needed in the procurement system, and they hope to present those to the Congress in June or July of this year.

The subcommittee is ready, of course, to give the Department's proposals full and fair consideration when they are presented.

The Government's perspective is only part of the acquisition equation, and the views of industry are vital. But the timely and effective delivery of quality weapons systems, goods and services to our forces in the field ultimately depends upon the degree to which industry can apply innovation and risk taking in an efficient and an effective manner.

In our parallel hearings in the industrial and technology base, the subcommittee has sought to identify improvements that can enhance the ability of the United States to use its technological and industrial strengths to improve our national defense.

Today we're going to explore with industry and outside witnesses the manner in which the acquisition process affects our ability to make the most of industry and of technology.

The first panel consists of three outstanding leaders from industry. Robert Trimble is a vice president of the Martin Marietta Corporation; serves on the board of various industry associations.

Paul Gross is the vice president and general manager of the Specialty Fasteners Division of Rexnord. He presently is serving as president of the Proprietary Industries Association.

And Earle Williams is the president of BDM International, Inc. He's past president and current member of the board of directors of the Professional Services Council.

These witnesses will give us an assessment of recent changes in procurement policy from the perspective of a major weapons system manufacturer, a second tier contractor, and the service industry.

Our second panel will consist of Michael Rich of RAND; Harland Ullman of the Center for Strategic and International Studies.

Mr. Rich, who is a vice president of RAND, has directed numerous defense-related studies and has authored several recent articles on the acquisition process.

Mr. Ullman served as executive director of the recent CSIS defense acquisition study.

Mr. Rich and Mr. Ullman will provide us with the views of outside experts on the effectiveness of the recent acquisition reforms.

Before I begin I would like to submit at this point the prepared statement of both Senator Dixon and Senator Gramm.

[The prepared statements follow:]

PREPARED STATEMENT BY SENATOR ALAN J. DIXON

Mr. Chairman, today's hearing is to review the Department of Defense's implementation of recent changes in acquisition policy from the prespective of the private sector.

As an author of the Small Business and Federal Procurement Competition Act, I firmly believe that we must have competition in defense contracting. However, I do not think that the Government should exclude quality as a criterion for the awarding of contracts. We must have a level playing field for domestic contractors and subcontractors.

The acquisition policy of the Defense Department must consider our industrial base. We do not want our industrial base capabilities to determine our defense policies and strategies. Rather, the United States should have an industrial base policy that builds our defense capabilities in support of that policy.

Thank you, Mr. Chairman

PREPARED STATEMENT OF SENATOR PHIL GRAMM

Mr. Chairman, I want to strongly commend you for holding this hearing today. The people we are about to hear from have very critical perspectives on the impact on so-called acquisition reform legislation as well as general trends within the defense industry and technology base.

The fact is that we have overloaded the defense procurement system with layer after layer of new requirements in our zeal to prevent the occasional horror story of an overpriced hammer. Because we have often approached this area in a piecemeal fashion, we have lost sight of the total cost of all of these recent changes.

I am pleased that we will have the opportunity to hear from the people who have to meet a payroll and satisfy their stockholders while navigating through the ever increasing layers of new Government regulations. I appreciate Chairman Bingaman's foresight in ensuring that we will hear from a subcontractor, a prime contractor, and from a member of the professional and technical services community.

The members of our second panel will also provide the useful perspective of objective outsiders who have been able to step back and broadly review the entire acquisition process. The type of analysis they have conducted should be made available more often to our committee.

Senator **BINGAMAN**. Let me go ahead with the first panel. Mr. Trimble, if you would go ahead; then Mr. Gross and Mr. Williams. We will of course make all of your statements part of the record of this hearing, and would urge that you summarize those statements or make any other comments you feel are appropriate.

STATEMENT OF ROBERT TRIMBLE, VICE PRESIDENT, MARTIN MARIETTA CORP.

Mr. **TRIMBLE**. Thank you, Mr. Chairman.

My name is Robert Trimble, and I am the vice president of contracts for Martin Marietta Corp. I am appearing today on behalf of the Aerospace Industries Association of America, Inc., the trade association representing the Nation's major manufacturers of aircraft, aircraft engines, helicopters, spacecraft, missiles, space launch vehicles, and their related components and equipment.

We very much appreciate the opportunity to appear at this hearing on a number of issues which are of great concern to us.

We also appreciate the excellent job that you have done, Mr. Chairman, with the support of Senator Gramm, in organizing this subcommittee and broadening its scope and agenda.

We stand ready to work with you in anyway that we can.

I would like to be exceedingly candid in my remarks today. I think that some of our industry who look to the Department of Defense as a principal customer have sometimes been timid to make candid observations about the acquisition process.

I hope that the Department of Defense will accept my remarks in a constructive and helpful spirit in which they are intended.

The relationship between the defense industries and the Defense Department should be one of partnership. And no partnership can be effective unless partners can speak openly with one another.

My central theme today is that the defense industry legitimately has a number of serious concerns regarding the acquisition process.

The problems I will discuss are as serious as they have ever been, and they require the attention of a constructive subcommittee like yours.

There is a broad concern in industry that when all the procurement reforms of the last several years are aggregated, both congressionally mandated reforms as well as departmental reforms, the procurement environment has become increasingly more difficult.

A number of the procurement changes have substantially shifted risks to contractors, and in my view, many of these risks that contractors are now being asked to assume are unconscionably high and not necessarily in the public interest.

The resulting environment may not motivate defense contractors to make essential investments in plant and equipment, or to sustain desirable levels of company funded independent research and development.

We are concerned equally that the anticipated substantial reduction in return on investment for defense contractors will discourage discretionary investment in defense related work.

The specific changes I am referring to include: revisions in the method of calculating permissible markup on negotiated contracts; requirements that contractors finance part or all of the cost of special tooling without adequate assurance of indemnification in the event of program cancellation; reductions in progress payments; increases in unallowable costs; use of fixed price contracts prematurely; requirements that contractors give the Defense Department price production options before the full scale engineering has been completed; inappropriate dual sourcing on some systems; disputes about materiel requirements planning systems; performance warranties on immature systems; cost-sharing of development efforts; warranties of the suitability of technical data provided to the government to permit production by another source; and extensive changes in the tax laws, which have an adverse effect on the defense industry.

The bottom line, Mr. Chairman, is that the business environment in the defense industry, as a result of the extensive changes which I have just listed, is unhealthy.

Contractors are required to make huge front-end investments in systems without adequate assurance of recovery.

Contractors are being required to make premature commitments to the price and performance.

Contractors are being asked to finance a larger portion of both capital investments and working capital, at the same time that their anticipated profits at the start of a project are smaller.

All this in the setting of generally increasing program uncertainty as a result of severe budgetary constraints.

I want to make clear this afternoon, however, that my testimony should not be heard merely as industry complaining about the erosion of potential profit.

More correctly, it is a concern for fundamental issues which transcend parochial interests. There are continuing requirements for companies to invest in plant and equipment, both in the initial stages of development, and during ongoing production.

If companies do not make these investments, productivity cannot be enhanced, and unit costs will remain higher than they otherwise ought to be.

It is furthermore in the Nation's interest that companies make investments in independent research and development so that we have the technology to meet the Soviet threat in the future.

Industry has never recouped all of their R&D costs from DOD, and companies will find it harder to pursue unreimbursed work, because they will have more limited financial resources.

Thus, my message today is that, for subtle reasons, and as a result of a disjointed and very complex chain of reactions, I deeply believe that the defense acquisition process is being hurt; and more importantly, our industrial readiness will be adversely affected.

There are other problems that I would also like to discuss with you. For example, the defense industry is today grossly overregulated. It is ironic that in a period in which we have emphasized deregulation, the defense industry has been turned into something approximating a public utility.

But unlike a public utility, we enjoy no assured return on investment. DOD regulation seek to control virtually every aspect of corporate operations.

Moreover, the audit and review burden is clearly excessive. Auditors both at the initiative of the Department and the Congress, have increased by the thousands in recent years.

It must be remembered that an auditor is a checker, not a doer. It takes the time of doers to respond to the demands of checkers. We are diverting too much of the doer's time to worrying about the checkers, adding to the cost of the deliverable end items without enhancement of their intrinsic value.

While on this subject of excessive regulation and audit, I would like to mention our very deep concern about leaks of information furnished in confidence to the Government.

Two recent instances of public disclosure, one involving IR&D ceilings negotiated by the Navy, and the other involving executive salaries and bonuses, indicate an alarming lack of sensitivity with respect to business confidential information which is likely to be exacerbated by excessive audits.

Regulation, audit and review continue to increase, even though industry has initiated a very sincere and I believe promising program of corporate self governance.

In response to the Packard Commission recommendations of last year, industry has created the defense industry initiative on business ethics and conduct. Almost all of the largest defense contractors are not signatories to this initiative, which requires the development of codes of conduct, training of employees in ethical decision making and compliance procedures, establishment of ombudsmen and hot lines within companies, and establishment of procedures for voluntary disclosure.

In the fact of this industry commitment, the Department of Defense should be looking for ways to moderate its audit and review burden, but there appears to be little evidence that this is happening.

It is also my belief that the defense procurement process has become needlessly criminalized. I am not an attorney, but I have been involved in the acquisition process for more than 30 years, both in Government and in industry.

Disputes which a few years ago would have been merely understandable business disagreements are now alleged to be fraudulent conduct.

Moreover, once a dispute is characterized as potentially fraudulent conduct, it is removed from the authority of the contracting officer and the auditors, and inserted into the criminal chain.

At this point, negotiated resolution, compromise, or even reasonable discussion are not longer part of the process. It is a process as complex as defense acquisition—in a process as complex as defense acquisition, with so many transactions, and so great a potential for honest error, we should resist the temptation to ascribe fraudulent motives to actions that can more often and more correctly attribute to ambiguous regulations, honest mistake, or lack of adequate attention to compliance detail.

This discussion, of course, is not a complete review of every concern that AIA members have. I have tried to focus on three major themes, which I think that everyone in our industry is concerned about: the adverse impact of the business environment on industrial readiness of aggregated recent public policy changes, the overregulation of the procurement process, and needless criminalization of contractor conduct.

I am not here to ask for specific legislative solutions. I am asking for something that in my view is even more important.

On behalf of AIA, I ask that this subcommittee place high on its agenda the energetic, continuing and effective oversight of the defense acquisition process, and its management by DOD.

I think that oversight can be much more important than legislation. We need this subcommittee to let the Department of Defense know that the subcommittee cares about and will closely examine issues like those that I have described.

This subcommittee should be an active overseer of the Defense Department/industry partnership I discussed earlier.

I am convinced that if we all work together, with Congress visibly overseeing the procurement process, and policies of the Department of Defense, we will be successful in meaningfully addressing many of the substantive problems that I have outlined.

Thank you very much. And I'll be happy to answer questions later on.

[The prepared statement of Mr. Trimble follows:]

PREPARED STATEMENT OF ROBERT TRIMBLE ON BEHALF OF AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC.

Mr. Chairman and members of the subcommittee, my name is Robert Trimble, and I am the Vice President of Contracts for Martin Marietta Corporation. I am appearing today on behalf of the Aerospace Industries Association of America, Inc. (AIA), the trade association representing the nation's major manufacturers of aircraft, aircraft engines, helicopters, spacecraft, missiles, space launch vehicles, and their related components and equipment.

We very much appreciate the opportunity to appear at this hearing on a number of issues which are of great concern to us. We also appreciate the excellent job that you have done, Mr. Chairman, with the support of Senator Gramm, in organizing this Subcommittee and broadening its scope and agenda. We stand ready to work with you in any way that we can.

I would like to be exceedingly candid in my remarks today. I think that some in our industry who look to the Department of Defense as a principal customer have sometimes been timid to make candid observations about the acquisition process. I hope that the Department of Defense will accept my remarks in the constructive and helpful spirit in which they are intended. The relationship between the defense industry and the Defense Department should be one of partnership, and no partnership can be effective unless partners can speak openly with one another.

My central theme today is that the defense industry legitimately has a number of serious concerns regarding the acquisition process. The problems I will discuss are as serious as they have ever been, and they require the attention of a constructive subcommittee like yours.

There is a broad concern in industry that when all of the procurement reforms of the last several years are aggregated—both congressionally mandated reforms as well as departmental reforms—the procurement environment has become increasingly more difficult. A number of the procurement changes have substantially shifted risk to contractors and, in my view, many of the risks that contractors are now being asked to assume are unconscionably high and not necessarily in the public interest. The resulting environment may not motivate defense contractors to make essential investments in plant and equipment or to sustain desirable levels of company-funded independent research and development. We are concerned equally that the anticipated substantial reduction in return on investment for defense contractors will discourage discretionary investment in defense related work.

The specific changes I am referring to include: revisions in the method of calculating permissible mark-up on negotiated contracts; requirements that contractors finance part or all of the cost of special tooling without adequate assurance of indemnification in the event of program cancellation; reductions in progress payments; increases in unallowable costs; use of fixed price contracts prematurely; requirements that contractors give the Defense Department priced production options before full scale engineering has commenced; inappropriate dual sourcing on some systems; disputes about material requirements planning systems; performance warranties on "immature" systems; cost sharing of development efforts; warranties of the suitability of technical data provided to the government to permit production by another source; and extensive changes in the tax laws which have an adverse effect on the defense industry.

The bottom line, Mr. Chairman, is that the business environment in the defense industry, as a result of the extensive changes which I have just listed, is unhealthy. Contractors are required to make huge front-end investments in systems without adequate assurance of recovery. Contractors are being required to make premature commitments to price and performance. Contractors are being asked to finance a larger portion of both capital investment and working capital, at the same time that their anticipated profits at the start of a project are smaller. All this is in the setting of generally increasing program uncertainty as a result of severe budgetary constraints.

I want to make clear this afternoon, however, that my testimony should not be heard merely as industry complaining about the erosion of profit potential. More correctly, it is a concern for fundamental issues which transcend parochial interests. There are continuing requirements for companies to invest in plant and equipment both in the initial stages of development and during ongoing production. If companies do not make these investments, productivity cannot be enhanced and unit costs will remain higher than they otherwise ought to be.

It is furthermore in the nation's interest that companies make investments in independent research and development so that we have the technology to meet the Soviet threat in the future. Industry has never recouped all of their IR&D costs from DOD, and companies will find it harder to pursue unreimbursed work because they will have more limited financial resouces.

Thus, my messge today is that for subtle reasons, and as a result of a disjointed and very complex chain of reactions, I deeply believe the defense acquisition process is being hurt and, more importantly, our industrial readiness will be adversely affected.

There are other problems I would also like to discuss with you. For example, the defense industry is today grossly overregulated. It is ironic that in a period in which we have emphasized deregulation, the defense industry has been turned into something approximating a public utility. But unlike a public utility, we enjoy no ensured return on investment. DOD regulations seek to control virtually every aspect of corporate operations.

Moreover, the audit and review burden is clearly excessive. Auditors, both at the initiative of the Department and the Congress, have increased by the thousands in recent years. It must be remembered that an auditor is a checker—not a doer. It takes the time of doers to respond to the demands of checkers. We are diverting too much of the doer's time to worrying about the checkers, adding to the cost of deliverable end items without enhancement of their intrinsic value.

While on this subject of excessive regulation and audit, I would like to mention our deep concern about leaks of information furnished in confidence to the government. Two recent instances of public disclosure, one involving IR&D ceilings negotiated by the Navy and the other involving executive salaries and bonuses, indicate an alarming lack of sensitivity with respect to business confidential information which is likely to be exacerbated by excessive audits.

Regulation, audit, and review continue to increase even though industry has initiated a very sincere and, I believe, promising program of corporate self-governance. In response to the Packard Commission recommendations of last year, industry has created the Defense Industry Initiative on Business Ethics and Conduct. Almost all of the largest defense contractors are now signatories to this Initiative, which requires the development of codes of conduct, training of employees in ethical decisionmaking and compliance procedures, establishment of ombudsmen and hotlines within companies, and establishment of procedures for voluntary disclosure. In the face of this industry commitment, the Department of Defense should be looking for ways to moderate its audit and review burden. But there appears to be little evidence that this is happening.

It is also my belief that the defense procurement process has become needlessly criminalized. I am not an attorney, but I have been involved with the acquisition process for more than 30 years, both in government and industry. Disputes which a few years ago would have been merely understandable business disagreements are now alleged to be fraudulent conduct. Moreover, once a dispute is characterized as potentially fraudulent conduct, it is removed from the authority of the contracting officer and the auditors and inserted into the criminal chain. At this point, negotiated resolution, compromise, or even reasonable discussion are no longer part of the process. In a process as complex as defense acquisition, with so many transactions and so great a potential for honest error, we should resist the temptation to ascribe fraudulent motives to actions that can be more often and more correctly attributed to ambiguous regulations, honest mistake or lack of adquate attention to compliance detail.

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I am not here to ask for specific legislative solutions. I am asking for something that in my view is even more important. On behalf of AIA, I ask that this Subcommittee place high on its agenda the energetic, continuing, and effective oversight of the defense acquisition process and its management by DOD.

I think that oversight can be much more important than legislation. We need this Subcommittee to let the Department of Defense know that the Subcommittee cares about and will closely examine issues like those I have described. This subcommittee should be an active overseer of the Defense Department—industry partnership I discussed earlier. I am convinced that if we all work together, with Congress visibly overseeing the procurement process and policies of the Department of Defense, we will be successful in meaningfully addressing many of the substantive problems I have outlined.

I will now try to answer any questions which you might have.

Senator BINGAMAN. Thank you for that excellent testimony. And I want to commend you, and all of the witnesses who are testifying today, for their candor in laying out some of these difficult issues.

I know it's not often easy to be critical of your only customer, and I do think that the Government in this case is the only customer we're talking about at least in many of these cases, so I do appreciate the candor.

Mr. Gross, go ahead, please.

STATEMENT OF PAUL J. GROSS, VICE PRESIDENT AND GENERAL MANAGER, SPECIALTY FASTENERS DIVISION, REXNORD

Mr. GROSS. Thank you, Mr. Chairman. Good afternoon.

I want to thank you very much for inviting me to represent the innovative subcontractor, speaking about my customer, my customer is to my left here, as well as the Government.

Senator BINGAMAN. Well, we would still appreciate candor. [Laughter.]

Mr. GROSS. Your invitation asked me to speak on the subject of defense goals, including innovation. I was glad that you believe innovation is still a goal for subcontractors, because in the last few years, it hasn't really looked that way to me.

In my limited time, I'm going to try to explain what an innovative subcontractor is, how we operate, and how we differ from prime contractors. Then I'll highlight some of the procurement policies and practices that we think are having a negative effect on us and on the defense effort.

I'll give an evaluation of what I think these practices are going to do if continued. Finally, I'll provide some ideas about what should be done to make them better.

I want to point out that I wear three hats as I sit here. First, I'm the president of the Proprietary Industry Association which represents over 70 innovative subcontractors that do business with DOD, usually indirectly through prime contractors.

Second, I'm the general manager of a good sized innovative subcontractor that makes aircraft fasteners, and whose business is 80 percent defense. This requires me to make daily decisions regarding these new procurement practices.

Third, I consider myself an informed citizen who believes and understands the need for a strong national defense based on advanced technology.

From all three points of view, I'm deeply concerned about the effects of recent procurement actions on our defense posture.

The innovative subcontractor I represent is significantly different from prime contractors, which makes some of the procurement actions especially harmful to us, and therefore, the industrial base.

Let me explain. Each innovative subcontractor has developed one or more background technologies that represents only a tiny niche of what the primes need to put their systems together.

Our capability is usually applicable to a broad range of specialized products that is of interest not only to military primes, but also to commercial and international customers.

Our technical specialties are often unique. Generally, no one else has the technical capability that we have. The primes don't; the Government doesn't. In this respect, we are an irreplaceable national resource in obscure but important areas which include heat exchangers, sensors, fasteners, and hydraulic devices.

We are in competition constantly. We compete by providing a better, more innovative product; not just price.

No one or even several contracts for our products can provide the payback necessary to justify the investment in our underlying technologies. The payback must come from many programs, military, commercial and international, over time, frequently it takes 10 to 20 years to realize an acceptable rate of return.

Most of us do all of our development at private expense. I think this makes us pretty good at accelerating good ideas and dumping the bad ones early in the game. Nevertheless, the inevitable failures inherent in innovation are expensive, and the cost of these have to be carried by the production of successful ideas.

Innovative subcontractors try to price their products based on the intrinsic worth the market gives to them, which has little to do with "costs". And remember, we do this while in competition with others, which means that our products really have to be better.

My favorite consumer example of this is the Maytag washing machine and the lonely Maytag repairman. People are willing to pay an extra $100 for a Maytag washer because they think it's better, and yet I'm willing to bet you that it doesn't cost a dime more to produce.

In my company, lock nuts for high performance aircraft provide a good example of this type of value. We have invented a lock nut that lasts a hundred times longer than competitive lock nuts, and we try to get ten times the price for that lock nut for a hundred times the worth.

Now what's happening to us as a result of procurement policy changes? I think there are three areas that are most important.

First, the procurring agencies are pushing the prime contractors toward subcontractor competition on every item, at any cost. The thrust toward 100 percent competitive reprocurement of identical items, no matter what, is very strong. To accomplish this the services have aggressively sought unlimited rights in technical data.

It started with the Navy and the Air Force several years ago, and seems to be reinforced by CICA, no matter what the intent was.

Competition at any price is also strongly supported in the DAR council regulations on rights in technical data, in spite of last year's corrective legislation. The net result is an innovative subcontractor who develops at private expense either agrees to give up his data or license his product, or he just won't participate on the new defense programs.

Second, greatly expanded proposal and contract auditing is eliminating the concept of price based on intrinsic product value, and making cost the only basis for price.

The Government has lots of tools with which to do this, and they are all being used very effectively.

Third, the profit guidelines have removed the small amount of weighting that used to be there for innovation, and the policy is working effectively toward reducing overall profit margins further.

I think all three of these factors impact the innovative subcontractor heavily because the laws and regulations are mostly, if not entirely, aimed at the primes. We were forgotten.

I think you can see that the auditing and profit guidelines are immediately and significantly reducing our revenues. And believe me, from personal experience, they are.

The pressure for us to give up our trade secrets and patents to a competitor is overwhelming and allows us to forecast further diminished revenue in the future, both from less volume in sales and from lower prices.

The net result is fewer resources now with a prospect of a lot fewer resources in the future, compounded by the diminished DOD budget.

It's hard for me to see how spending money on risky innovation now is ever going to pay a decent return in the defense market. So I am cutting that spending. I'm dragging my feet about doing it, but as revenue goes down, so does the innovation, because it looks like an expense that has little benefit.

As I do this, my company becomes a lower cost producer of present technology. Other innovative subs have taken a variety of different tacks, but all result in less innovation for the defense market.

Some companies are only offering their second or third best technology to DOD, if it has to be second sourced, especially when they have lots of nondefense business.

Other companies with very good technology but only a small percent of defense business are taking a hard line that amounts to, "Give me a fair deal or I won't play."

All innovative subs are resisting as long and as hard as possible giving up their data rights on their best technologies, because this amounts to giving or selling cheaply, their most valuable assets.

Ultimately, I think businessmen, maybe like politicians, are survivors. We will adapt to our environment. The message that we are getting is that the procuring agencies want competition and low cost manufacturers, and are not willing to pay for private innovation. We can adapt to that.

I've been in a number of innovative subcontractors' factories. They are very efficient; with less engineering overhead for new innovation, their costs can be quite low.

I can't predict the future, but I can assure you that we have already started moving toward less innovation at private expense.

I think this is a loss for our defense effort, and a loss for the American aerospace industry, which has always been one of our strongest foreign exchange producers.

We are moving toward second best, with the defense procurement agencies leading the way.

So what do I think we should do about it? I would like to say, get Government off our backs so that we can do our thing, which is competing by innovating. I'm concerned, however, that the military agencies and the prime contractors are so geared toward competition at any price that it may take even more legislation to get them to change direction.

Certainly oversight by this committee is needed. Without a doubt, what innovative subcontractors want is for our military customers to give the same respect to our trade secrets and patents that we get in the commercial world.

We certainly hope that our military customers continue to buy the best weapons systems that they can afford, not just ones where every spare has at least two sources of an identical item, and we hope that there can be a contracting environment where the price of an innovative product can be based on the value that the buyer perceives, not just its cost.

I think there are good ways to accomplish these goals, and PIA stands ready to help you. If they are accomplished, innovation will be encouraged. If we don't accomplish these goals, I think American defense and aerospace technologies are heading toward a second rate status with all that implies.

There are no free lunches, Mr. Chairman. Innovation has to be paid for, one way or another. Innovative defense subcontractors have an enviable international track record developing new technology at private expense. American policymakers have to decide soon if they want that track record to continue, or to let it become second rate, or worse.

Defense procurement practices have gone too far, the wrong way.

I want to conclude, Mr. Chairman, by again thanking you for giving innovative subcontractors the opportunity to present our point of view. I hope it has hjelped, and I would enjoy trying to answer your questions.

[The prepared statement of Mr. Gross follows:]

PREPARED STATEMENT OF PAUL J. GROSS, PRESIDENT, PROPRIETARY INDUSTRIES ASSOCIATION

My name is Paul Gross and I am appearing as President of the Proprietary Industries Association. My other hat is that of Vice President and General Manager of Tridair, and aerospace fastener company that is part of Rexnord, a subsidiary of Banner Industries. I appreciate the invitation, Mr. Chairman, and members of the subcommittee to appear before you today.

The committee has asked me to testify as a representative of a typical defense subcontractor. While I cannot claim that my interests are always identical with all defense subcontractors, I believe that the concerns of innovators in the subcontracting community do not differ substantially from those of PIA members. The Proprietary Industries Association is a national association of over 70 defense subcontractors who have traditionally developed products and processes at private expense. Fifty percent of our members are small companies. We think of ourselves as technological problem solvers.

The Association was formed in October of 1985 to seek government support for balanced procurement policies which encourage privately funded innovation for defense markets. Trade secret protection is a concern to any company that competes in any market—defense or commercial, domestically or internationally; it is of paramount importance to us.

Statistics on the dollar volume and number of defense subcontracts are scarce. According to an OFPP study, 50% of government contracts dollars awarded to prime contractors go to subcontractors. Reliance of any one business on defense varies. My business is 80% defense oriented.

Procurement laws and regulations adopted in recent years have tended to focus solely on prime contractors. These same government procurement policies have had a dramatic impact on subcontractors. We are subject to the same business cycles that affect prime contractors, and a growing number of policies and contract terms and conditions are flowed down to subcontractors. However, in our judgment a number of these policies do not adequately recognize the role of subcontractors and are not appropriate for innovative subs who develop at private expense. Historically, innovation at the component, subsystem and detailed process level is accomplished by innovative subcontractors solving technical, or generic problems. The problem and the solution may be recognized long before there is a specific military program requiring its application. When a technical problem is identified during conceptual design or systems designs for which the prime doesn't have in house expertise, they seek out knowledgeable and proven experts in the technological field. Generally, the primes go to innovative subcontractors who solve the problem at their own expense or who already have a solution because they anticipated the problem.

These innovative companies are a national resource because of their expertise in specific technological niches. We are willing to assume the risks inherent in innovation because we believe the solutions we identify will have uses in other commercial, military, and international markets.

IMPACT OF RECENT PROCUREMENT ACTION—OVERVIEW

Since 1983, Congress and the Department of Defense have changed the procurement policy climate (and contracting activity) substantially. The claims of "waste, fraud, and abuse" resulted in the Competition in Contracting Act, the Defense Procurement Reform Act of 1984, the Defense Procurement Improvements Act of 1985, the Defense Acquisition Improvements Act of 1986, and the Antikickback Act of 1986, to name a few. As you know, these statutes, plus departmental activity, have resulted in dramatic increases in DAR Council cases, which taken together consitute massive revisions to defense contracting procedures and rules. In fact there have been so many changes, that not even government contracting officers are capable of learning and complying with the rules in a timely manner.

The goals and intent inherent in these reforms are not bad. Taxpayers should receive the most defense for their tax dollar. Each of us has a right to expect that the weapon systems procured will work. I am concerned, however, that we are seeking the cheapest weapons at the expense of future technological advancement. My remarks focus on that concern.

The U.S. has sought, as a matter of policy, to achieve technological superiority over our adversaries and potential enemies and accept numerical inferiority. In times of budget constraints, this objective becomes even more critical. Technological superiority, in order to be maintained, requires that innovation must be constantly occurring. The long term impact of the current business environment in defense, and the cumulative impact of procurement laws and regulations will undercut our ability to produce technologically superior weapons and undermine our international leadership in aerospace technology.

Innovation is expensive. For defense markets the genesis of innovative ideas and the financing of their development has only two potential sources—the government or a prospective contractor or subcontractor (which includes the commercial sector).

When a business innovates at its own expense, the investment is made in research and engineering with the intent of obtaining an adequate return on resulting products and processes. Research and development in a cost center, not a profit center for innovative private expense subcontractors. The R&D expense is part of the investment incurred in bringing a new product or process to market. If you keep in mind that overcoming a technological barrier is a risky process of trial and error, it is easy to see that only that profits generated by the successes can finance the trial and error.

We are a success oriented society. People involved with taking risks in innovation do not talk about their failures. I'm here to tell you that there are a lot of failures. In fact, the more we are willing to venture into the unknown for the big breakthroughs the more likely we are to fail. The failures are very expensive but they are a necessary part of the process—not a sign of bad management.

Many of the new approaches to defense contracting and defense subcontracting are making an adequate return on investment for innovation extremely risky. Unfortunately, if these trends continue, we won't be able to measure the damage until it's happened. To borrow a quote, we hope this committee will do "a surgeon's job to cure, not [perform] an autopsy to find out why the patient died." The worst way to find out is when our aerospace systems prove to be not as good as our international competitors.

I do not intend to take the time to recount the impact on subcontractors of each of the numerous changes in the defense procurement process. I will focus on several of the new or emerging policies which, individually and/or combined, are causing me to rethink the investment decisions I make regarding innovation for defense markets.

RIGHTS IN TECH DATA

Following the spares "horror stories", the services and OSD both took the tact that spare parts prices could be reduced through competition, and that the way to get competition was to secure rights in technical data for all spare parts and make that technical data available to all potential bidders. PIA was organized to respond to this approach. I hasten to add that competition, as it is defined in CICA, is not the problem. Full and open competition is defined as meaning "that all responsible sources are permitted to submit sealed bids or competitive proposals on the procurement" (10 U.S.C., 2305). Competitive proposals are, under the law, an acceptable procedure to use when sealed bids are inappropriate. Sealed bids are to be used only when 1) time permits, 2) the award will be made on price and price-related factors only, 3) preaward discussions are unnecessary, and 4) there is an expectation of receiving more than one bid.

My company, and many other subcontractors, compete to have our products used by prime contractors on major systems using "competitive proposals". In the past, evaluative factors for our products included price, quality, performance, life cycle costs in addition to service, maintainability and other factors that have a bearing on improving the value of the weapon system. Today, price seems to be the only important evaluative factor. Value of the product is less important.

The subcontractor is at special risk with respect to the issue of rights in technical data. Prime contractors have long sought technical data from subcontractors, but the availability of data to a prime was not an overly restrictive barrier to subcontract award. The prime contractor negotiates directly with the government and frequently accepts contractual terms and conditions prior to any negotiation with subcontractors. If, as we have seen on major weapons systems contracts during the past two years, the prime accepts a clause which require it to give up all rights in the technical data, a subcontractor must do likewise or not participate. For subcontractors like myself with 80% of my business dependent on defense markets, giving up data or license right at the low cost expected by the Government will prohibit me from obtaining a fair return on my investment in innovation.

Prior to 1983, DOD encouraged private innovation and more or less honored the property right of a contractor or subcontractor in the technical data associated with a product or process developed at private expense. This was done much the same way as it is done in commercial industry.

Beginning in 1984, however, the services required private expense developers to either give up, or cheaply sell the rights in their data in order to participate on defense programs. Probably the best example of this is the V-22 on which Bell and Boeing made the availability of rights in data a condition of participation. Congress was concerned about this shift in policy and in 1984 enacted legislation to balance government's and industry's interest in rights in technical data. Last year Congress again passed corrective legislation to reinforce this balancing of interests and overturn certain DOD actions. The final proposed regulation is due to be published by April 16.

Last week, Under Secretary of Defense for Acquisition Godwin stated before this subcommittee that the upcoming regulations "balance the government's need to encourage innovation and private development for satisfying government requirements with the sometimes conflicting need to obtain rights in technical data for purpose[s] of competition." I'm pleased that the Under-Secretary characterized innovation and private development as a government "need" because the proposed regulations only recognized competition as a government need, and did not identify privately funded innovation as a need.

In our view these regulations will allow the services to perpetuate the abuse of their monopsony power with respect to private development or modification of commercial items for defense needs. Protection of a private developer's property rights has provided the incentive to invest in innovation for defense just as it has in the commercial world. We should not be compelled to sell or relinquish our know-how and trade secrets to the government or a potential competitor at less than its market value. A competitor who does not have the expense of development will be able to consistently underbid us. With price as the principle bid evaluation factor, revenue will be lost and the funds necessary to continue innovation will be diminished.

Unless the regulations have undergone substantial and unexpected revision since they were published for public comment, I would characterize these regulations very differently than Mr. Godwin did. They will not achieve the balance that Congress intended and that Mr. Godwin described.

MULTIPLE SOURCING OF IDENTICAL ITEMS

The direction to multiple source identical products, as it is being implemented, also discourages subcontractor investment in innovation.

Prime contractors are requiring multiple sources of the identical item for all components of the "major system" as a condition of program participation. Multiple sourcing the subcontractor's product or process will mean further fracturing of an already small market. Although my market is highly competitive, the sales volume of most single items can only support one supplier. The practice of requiring all technical data to be shared with another source, or that a competitor be licensed, will diminish if not eliminate the incentive to innovate especially for the important and risky breakthroughs. Many of our products are derived from the same background technology. Requiring us to give up data or license to artificially create a second source, forces us to jeopardize the competitive position of our products in *all* markets.

For subcontractors who face this requirement as a condition of being responsive to a solicitation, or as a condition of winning a contract award, the end result is exactly the same as if the government required the subcontractor to relinquish rights in technical data.

When primes impose this requirement (either at their own initiative or pursuant to a government requirement), it would appear that prime contractors are doing what the government is prohibited from doing under P.L. 99-500. That statute states that "a contractor or prospective contractor shall not be required, as a condition of being responsive to a solicitation, or as a condition of award, to sell or otherwise relinguish rights in technical data . . .".

During the hearings held by the President's Blue Ribbon Commission on Defense Management, Chairman Packard made the following remark: "That is what innovation is, to go out and do something that somebody else cannot do, and it is successful if that [something that somebody else cannot do] is of sufficient value to the customer that the customer will buy it. It has nothing to do with competition."

If you are required to teach your competitor to do the same thing that you "can do," why innovate in the first place?

The perception that multiple-sourcing increases price competition and strengthens the industrial base is only partially correct. Multiple sourcing of identical items may increase price competition, in the short run. It will have an adverse impact for the quality of the industrial base in the long run in terms of technological advancement.

W. Edwards Demming, the American born guru of Japanese manufacturing quality, fiercely advocates that competitive sourcing on a price basis misses the point, saying, "the Japanese aren't just interested in finding the lowest price from suppliers. Their main requirement is a working, long-term relationship. Given that, the rest all falls into place." While Dr. Demming doesn't berate competition, he also doesn't undervalue the more positive benefits of forging working relationships with reliable, high quality suppliers. Multiple sourcing, to the extreme, can actually work to defeat its intended purpose.

PROFIT POLICIES

Chairman Packard made a remark about pricing during those same hearings which has some bearing on the issue of innovative defense contractor and subcontractor profits. "There are quite often small firms and large firms, too, that develop a unique product, and it is of value to somebody, and its price is determined not because of competition but simply because it is worth a hell of a lot more to somebody to buy it, and it is a unique product in the commercial market. People buy that because it is worth more whatever the price. The question is why should the government have any preferred position in relation to the commercial market? That is one of the tough issues."

I agree. It is a tough issue especially for innovative subcontractors whose whole business strategy is to invest products of high value as perceived by the user.

Last year, Congress directed DOD to change the profit guidelines to emphasize capital investment in equipment and contractor risk and de-emphasize contractor costs. The new guidelines eliminate any weight for independent development and reduce overall profit. Progress payments for contractors and subcontractors were also required to be reduced by at least 5% below the then present levels for both large and small businesses. Based on its own DFAIR study, the Department lowered prenegotiated profit objectives by 1%. We think that the new guidelines will reduce innovative subcontractors and contractors profits by much more than 1% by reducing independent development. In addition, the new guidelines disincentivize innovation.

None of us, in business, like to have profits arbitrarily set. As Mr. Packard so succintly stated, in commercial markets, the price of innovative products reflects the value to the purchaser. Neither profits nor price are direct functions of cost, although obviously the cost a business incurs in the development and manufacture of a product does influence the price.

Downward pressure on profits will have adverse consequences for both the government and industry. As allowable profit percentages decline, and DOD attempts to encourage capital facilities investment, the private expense developer faces a catch 22. Productivity enhancement through modernizing capital equipment is a desirable goal. However, to invest in modern machinery, a business will look to its ability to achieve a positive return on the investment over a period of time. That means keeping the savings for an extended period of time. In my own business, I have made the decision to reduce or delay modernizing for just that reason. I cannot justify the investment because most of the savings I would realize must be given away as a price reduction, and maximum allowable profit margins are too small to make up the difference.

A manufacturer who has invested in innovation to gain a "competitive edge", and is then required to share his competitive edge with competitors, faces such a diminished market and a diminished return that innovation is no longer worthwhile. The payback for modernizing can take much longer or never occur. Obviously there is no economic reason to invest in capital equipment under these circumstances. In commercial markets, profit is limited only by the inherent value of the innovative product and the "competitive edge" can be retained through and trade secrets protection.

Investment in capital equipment may permit the manufacturer to become a low cost producer but the increased profit potential is marginal and the payback period is longer. For innovators, reducing the investment in research is a faster, less risky way to become a low-cost supplier. Mr. Vander Schaaf, the DOD Deputy Inspector General, recognized this in his testimony last week. He said, "concentrating too much attention on profits could reduce or penalize innovation because contractors may be prevented from realizing significant monetary benefits from introducing new managerial or technical or production improvements". Mr. Vander Schaaf was addressing cost cutting innovation, but the result is the same. Concentrating too much attention on profits could reduce or penalize new product and process innovation which is where major cost and technology improvements come from.

MULTIPLE AUDITS AND REVIEWS

There has to be a better way. In the past three years, we have been inundated with audits and reviews by the prime contractors, the IG and DCAA. While I appreciate the government's concern, and the benefits they see in numerous audits, it represents a costly expenditure of resources for both government and industry. Considerable time and effort is expended by PIA members educating government employees regarding our manufacturing and testing, only to have another prime contractor or government employee to educate a few days later. It is probably true across our entire tier. Increases in overhead costs are being incurred and passed on to the government, especially by our small business members. For a small business, the regulations are very complex and require sufficiently sophisticated employees to protect the company's interests. One of our small business members recently noted that he was paying his "audit interface person" more than his chief toolmaker. His toolmaker is directly involved in a lot of his invaluable innovation.

Also, in his testimony before this committee last week, Mr. Derek Vander Schaaf identified a myriad of activities to deal with fraud, waste and abuse. We applaud the IG's efforts; and we understand the purpose of audits is to find fault. But too many audits and reviews reflect a government/contractor relationship obsessed with finding fault. This leads to a more adversarial relationship rather than one of cooperation, and our national goals suffer. In the last few years my company has gone from three to sixty audits per year. Many of our members report a three-fold increase.

I understand that legislation to incorporate a contractor profit monitoring function in the Office of Federal Procurement Policy has been introduced in both the House and the Senate. It seems to me that adding another layer of "audit", since profit studies inevitably become cost studies, can do nothing but add to the expense of contracting. I wonder if we are paying $1.00 to determine whether the Government might recover ten cents.

CONCLUSION

In summary, the Services are zealously using their monopsony power to force competition into every procurement action in such a way that privately funded innovation is threatened. The government's principle criterion for procurement is to obtain the lowest cost possible without regard for the importance and cost of innovation. Such action threatens privately funded innovation, international aerospace competitiveness and the U.S. industrial base.

The policies I've described are reducing prices by a competition at any cost mentality and by shifting risk from the government to the contractors and subcontractors. Government is reducing reimbursable costs and reducing profits which will reduce our ability to invest in the kind of advanced innovation that is necessary to keep our country on top. The message we are getting from our government customer is 1) high risk privately funded innovation for defense is economically unsound, and 2) the profitability of future defense business does not justify much if any investment in this business.

Notice I did not say we would go out of business or leave defense markets. We businessmen (maybe like politicians) are survivors. We will adapt to the environment, some quicker than others and some not at all. Many of us will become pretty good at being low cost producers of old technology. There is no way to measure the innovation we didn't get until we need it or until we're surpassed by our international competitors or adversaries.

There are no free lunches. By all studied accounts the waste and fraud in defense procurement was a tiny percent. Prices are being driven down much further than the elimination of waste and fraud requires, and the pendulum has swung too far. The result will be less investment, less risk taking and an unhealthy defense sector.

Thank you for the opportunity to present my views to you today.

Senator **Bingaman**. Thank you very much, we appreciate that testimony.

Mr. Williams, why don't you go right ahead?

STATEMENT OF EARLE C. WILLIAMS, PRESIDENT, BDM INTERNATIONAL, INC.

Mr. **Williams**. Thank you, Mr. Chairman.

In preparation for appearing here today, I've been spending more time than usual reading about other people's views of the defense acquisition process. Also this past weekend, I had the opportunity to review the CSIS defense acquisition study, dated March 1987, "U.S. Defense Acquisition: A Process in Trouble."

As I read through the CSIS report, I became more and more pleased that somebody had put out another fine piece of work on the acquisition process. When I got to the appendix and scanned the list of the senior advisory group, I found your name in there, Mr. Chairman. It made it a lot more pleasant to think about coming up here today to talk with you. That report was a fine piece of work.

Senator **Bingaman**. Mr. Ullman's going to testify on it here in a little while.

Mr. **Williams**. I understand he is.

Today, I'd like to address the defense acquisition process as it pertains to recent changes in the defense acquisition policy and the state of our defense industrial base, from the perspective of a company whose business is providing professional and technical services primarily to our defense establishment.

I understand that you have copies of my testimony, so I'm going to focus on the primary issues at hand in the time that I have here.

First, a little background. The development and growth of new technologies and methodologies have given new meaning and scope to the phrase, professional and technical services companies.

Although the dollar value of the activities of the professional and technical services industry is less than 10 percent of the total defense contractor effort supporting defense capabilities, the significance of the services the industry provides in support of defense weapons and other systems far exceeds the dollar value proportions.

The professional and technical services industry in this country has grown very rapidly over the past 15 years, and indeed, just last year, the Office of Management and Budget revised its Standard Industrial Classification or SIC codes to include a new major group, 87, for selected professional and technical services.

Before this, we were simply lumped under, other. And Senator, I got tired of being "other" after 20 years in this business. So we're very pleased about that improvement.

To illustrate the dramatic growth of the professional and technical services industry, I'd like to cite some figures from the 1982 Census data, and a preliminary paper detailing some rough estimates of the scope of the industry in 1987.

These data were prepared by Dr. Jacques Gansler, vice president of the Analytic Sciences Corporation, which is a member company of the Professional Services Council.

The 1982 data indicate the following: Annual sales of $75 billion. Employment of 1.5 million people. And approximately 150,000 establishments with payrolls.

The 1987 data, although only a rough estimate, clearly illustrate that the professional and technical services companies are part of a dynamic, and more importantly, growing industry, with, I might add, some international connotations also.

I would like now to turn to the proposed DOD profit policy. Probably no issue is of greater concern today to the professional and technical services industry than the proposed profit policy rule, which DOD issued as an interim rule on December 1, 1986, for public comment.

The effect of the rule is to change DOD's weighted guidelines method of determining profit objectives on negotiated defense contracts by placing increased emphasis on facility capital employed and on contractor risk.

Supposedly, the interim rule reflected congressional intent as set forth in section 9105 of the Defense Appropriations Act of 1987, and the related language in the conference report accompanying the appropriations act.

This is simply not the case. Framers of the interim rule on profit policy have lumped manufacturing firms and R&D and services firms together.

The Congress understood that there's real and meaningful difference between these types of firms. In the statement of managers to the conference report for the DOD Appropriations Act, 1987, the Congress recognized that professional and technical service firms do not have, and generally should not have, investments in facilities comparable to manufacturing firms; and that the assets of our types of companies are different.

As I'm sure you appreciate, those assets of the professional and technical services firms are its people and their skills; their collective innovativeness and brainpower; and the effective organization and management of these professionals.

Recognizing this, the congressional conferees developed report language to the DOD Appropriations Act which specifically acknowledges the special circumstances of the professional and technical services industry.

And I quote:

> The conferees recognize that some types of firms, such as professional and technical services firms, doing business with DOD inherently are called upon to make less capital investment, and may participate in projects with less total risk.
>
> It is the conferees' belief that, notwithstanding this modified emphasis, any profit policy must ensure that firms performing satisfactorily for the Department of Defense earn a reasonable profit.

Representatives from the industry have met with DOD officials, but have received no encouragement that revisions in the rule would be made to provide meaningful relief to the industry.

A brief look at the interim rule shows why professional and technical service companies would suffer inequitable treatment in comparison to manufacturing firms.

The manufacturing firms' contract profits would generally be reduced by one profit point, from about 13 percent to about 12 percent, a reduction in gross profit of 7 or 8 percent on DOD contracts.

But for professional and technical services firms, the new profit policy would reduce contract profits from the previous level of 7 or 8 percent to the level of 4 or 5 percent.

This 2 or 3 percent profit point reduction means a 25 to 40 percent reduction in gross profits on DOD contracts, and that's compared to a 7 or 8 percent reduction for manufacturing firms.

No wonder the professional and technical service firms are up in arms.

I urge a broad, judicious, and balanced approach which recognizes the unique character of the professional and technical services industry, the lower profit margins of the industry, and its importance to the innovation and technological push it provides to our national defense effort.

Mr. Chairman, I believe that this subcommittee, in exercising its responsibilities for oversight of the defense acquisition policy, can make an invaluable contribution to the solution of the profit policy issue.

It can make clear to DOD the congressional intent that professional and technical services firms performing satisfactory work for the DOD should earn a reasonable profit and urge the Department to correct its misinterpretation as it is reflected in the proposed profit policy rule.

I would prefer to avoid urging Congress to enact any additional legislation on this issue. But if there are no other alternatives, I would argue for corrective legislation.

RESEARCH AND DEVELOPMENT PROGRAM

The importance of an aggressive R&D policy can't be overstated. Unhappily, the Competition in Contracting Act has been and continues to be administered in a manner that tends to discourage unsolicited proposals and sole source awards, which experience has shown to be key elements in fostering a climate for an aggressive R&D program.

This issue was raised and discussed during the November 13, 1985 hearings before Senator Quayle's subcommittee. You, Mr. Chairman, were instrumental in trying to deal with this problem by having included in the DOD Authorization Act for 1987, Section 923, which highlighted and extended the scope of noncompetitive procedures for contract awards.

DOD was given 6 months in which to issue appropriate implementing regulations and that 6 months will end around mid-May.

It's now April, and to date, we've not seen or been informed about any forthcoming implementing regulations.

I'd like now to talk about the congressional practice of placing ceilings on IR&D and B&P funds, and this is one area where the DOD is subject purely to the wishes of the Congress.

With ceilings on IR&D and B&P funds, you are, for all practical purposes, capping the scientific curiousity and ingenuity of the R&D community to which we must look for meaningful advances in our defense technological capabilities and weapons.

Mr. Chairman, the IR&D and B&P program and the way it's managed is one which I firmly believe is an important element in your subcommittee's concern with the defense industry and technological base, and should be viewed from this broad perspective.

DETERIORATION IN GOVERNMENT-INDUSTRY RELATIONSHIPS

The area of Government-industry relationships is a delicate one where both sides feel that they are the injured and aggrieved party.

To some degree this is true, but neither side is without fault. The bottom line is that we need to eliminate this adversarial environment which encompasses the Congress, the executive branch, and the defense contracting industry.

As an aside, I'd like to note, if you didn't see it in yesterday's edition of The Wall Street Journal, that Mr. Robert Costello, the Assistant Secretary of Defense for acquisition and logistics, told reporters that, quote:

> An effective defense requires a vigorous and productive industrial base unencumbered by overly tense relationships between Government and business.

And to that, I can only say, hurrah. And if this committee can work with that, and if those of us in industry can cooperate, maybe we can get this ballgame going again.

I believe that this committee can play an important role in this process. This committee, and its counterpart in the House, can play an important and vital catalytic role by bringing together formally in hearings, and informally in your offices, representatives of industry and the executive branch on issues stemming from legislation.

Congressional intent is often at the heart of the issue, and I believe this can be clarified without affecting the management prerogatives of the DOD.

I am convinced in some cases that the DOD management believes that they are really carrying out congressional intent, whereas when we have spoken with those of you who helped make the law, we know that they're not in fact carrying out your intent.

Last year, through your leadership and other members of the committee, two amendments were added to the 1987 DOD Authorization Act as a result of testimony before Senator Quayle's subcommittee on defense aquisition policy.

One amendment recognized the importance of quality over cost in the procurement and selection of professional and technical services.

The other amendment dealt with unsolicited proposals by professional and technical services firms, and states that the unique capability of the source providing the services should be an important consideration in the selection process.

Both amendments are effective on contracts awarded after May 14, 1987. Today is April 9, 1987, about one month before the effective date, and we've yet to see any proposed regulations implementing the legislative changes.

DOD needs to take actions to streamline the regulatory process in order to implement legislative changes in a timely manner. Timeliness and responsiveness to change are imperative if industry is to successfully provide the cutting edge technologies for our defense effort.

Your committee, with its oversight responsibilities, can help bring about this highly desirable goal.

Thank you, Senator, it was a pleasure to have the opportunity to appear here today.

Senator BINGAMAN. Thank you very much.

[The prepared statement of Mr. Williams follows:]

PREPARED STATEMENT OF EARLE C. WILLIAMS, PRESIDENT AND CHIEF EXECUTIVE OFFICER, BDM INTERNATIONAL, INC.

THE ACQUISITION PROCESS FROM THE PERSPECTIVE OF THE PROFESSIONAL SERVICES INDUSTRY

Mr. Chairman and members of the committee, I am Earle Williams, and I am appearing today as president and chief executive officer of BDM International, Inc. (BDM). I very much appreciate this opportunity to appear before your subcommittee. I have appeared before your subcommittee before, and I value these opportunities most highly, I know from past experience that you want me to be frank and forthright about the impact of legislation and policies on defense contractors. Today I would like to address the defense acquisition process as it pertains to recent changes in defense acquisition policy and the state of our defense industrial base from the perspective of a company whose business is providing professional and technical services primarily to our defense establishment.

Defense acquisition policies and many aspects of the acquisition process were prominent topics of debate during the 99th Congress and eventually were the subjects of legislation, Mr. Chairman, I applaud the efforts of the subcommittee to examine the effects that recently enacted procurement legislation have had not only on the acquisition process and its management by DOD but on the many companies, large and small, which make up the industrial and technological foundation of our Defense programs. We in the private sector are just beginning to feel and understand the full impact of legislation enacted by previous congresses in terms of our ability to satisfy the needs of our defense establishment effeciently and economically while maintaining our economic viability and profitability. The efforts of this subcommittee to assess the effects of previous legislation that shape defense acquisition policies and regulations on the Nation's Defense Industrial and technological base are to be commended.

Mr. Chairman, in expressing my views I will be drawing on almost 25 years of experience with BDM in providing professional and technical services to Government and private sector clients.

THE PROFESSIONAL AND TECHNICAL SERVICES INDUSTRY

Your have heard other witnesses, primarily those associated with the manufacture of equipment and supplies for defense systems, describe the impact of recently enacted procurement legislation on their companies and business operations. The professional and technical services companies share many of those views, but the legislation also has certain impacts which are unique to Services companies, before discussing any specifics, I would like to briefly explain what I mean by "professional and technical services" firms and then illustrate this by describing activities of BDM.

The development and growth of new technologies and methodologies have given new meaning and scope to the phrase "professional and technical services companies," Today, the industry encompasses research and development firms, computer software development houses, independent laboratories and test facilities, architect and engineering firms, systems integration and support companies, public accounting firms, program analysis and evaluation organizations, to name a few. The personnel in our companies are engineers, mathematicians, physicists, statisticians, accountants, program analysts, artificial intelligence specialists, computer scientists and programmers, social scientists, and specialists from many other disciplines.

In this modern hi-tech world, one can no longer equate the phrase "professional and technical services" to "consultants" or to "studies and analysis." Yes, a professional and technical services firm is very likely to be doing some of that, but it is almost certain to be doing far more. The services being provided by these firms are much broader in type and scope and are an integral part of the process for procuring defense weapons and other systems. These services must be provided to DOD by the professional and technical services industry or DOD must staff itself to perform them.

Although the dollar value of the activities of the professional and technical services industry is approximately 10 percent of the value of the total Defense contractor effort supporting our defense capabilities, the significance of the services the industry provides in support of defense weapons and other systems far exceeds the dollar value proportions. Without these services, all this sophisticated equipment would not constitute a truly meaningful weapons or other defense system. Today's modern, diversified professional and technical services company in the defense area is retained by DOD of the military services to undertake activieties which are an integral part of the development, production, operation, and maintenance of a weapons system.

To demonstrate the foregoing more specifically, I would like to use BDM as an example. Since its founding, BDM has provided increasingly diversified professional and technical services, including substantial software, scientific, and engineering services to the Defense Department. These services consist primarily of the expertise of our employees, augmented by specialized equipment and, on occasion, proprietary computer programs.

Let me illustrate what I mean with several contracts that we have with DOD. BDM is providing program design and technical support to Darpa's strategic computing program through the development and application of machine intelligence technologies. These technologies are based on new capabilities in artificial intelligence, computer architectures, and infrastructure developments, such as ways to rapidly prototype advanced microelectronics. Throughout 1986. BDM scientists addressed the field of artificial neural systems and its potential applications. Such systems, mimicking the manner in which the brain processes information, represent an innovative approach to computer architecture totally different from current numerical-based, software controlled computers.

BDM also explored the ways optics can be effective in computing, using symbols rather than numerics, and we evaluated the performance and quality of modulators that can rapidly change the spatial features of a light beam under command of an electrical signal. To support this work, the company has established an optical computing laboratory to evaluate these components and architectural concepts.

Another illustration, is the work BDM does for the Air Force Operational Test and Evaluation Center (AFOTEC). BDM has performed advanced T&E tasks in support of such diverse air force acquistion programs as the F-4G advanced Wild Weasel, Milstar, the consolidated space operations center, the high speed antiradiation missile, and the next generation weather radar. Our support to afotec has also included the successful completion of the analytical test and evaluation software system—a flexible data processing tool that allows almost immediate response to changing test requirements in the field.

A final example is the support BDM provides to the command, control, and communications countermeasures joint test (C^3CM–JT). The company developed computer models with artificial intelligence methodologies to help analyze C^3CM effects on the outcome of battles. We employed and enhanced a family of simulation models developed over the past decade for more than fifty clients. One case in point was the development for afotec of enhanced surface-to-air missile simulations, which performed detailed investigations of one-on-one engagements between U.S. aircraft and Soviet missiles.

As military systems increase in cost and complexity, computer-based testbeds simulating operational Activities have significantly reduced testing costs. One such tested simulation supported by BDM in 1986 was the identification, friend, foe, or neutral tested, designed to assess the identity of individual "players" in a battle simulation.

In summary then, our clients use our services to provide the analytic basis for policy development and decisions; to help identify requirements for new systems and equipment; to design and integrate new hardware and software systems to meet Defense objectives; to test and evaluate hardware prototypes; to support the design and management of training and exercise activities; to design and construct specialized instruments and equipment incorporating lasers, sensors, and microprocessors to enhance operational capabilities; to operate ranges and test facilities; and to undertake operational tasks requiring specialized or unique scientific, engineering, and technical expertise.

The professional and technical services industry in this country has grown rapidly over the last 15 years. Indeed, just last year, the office of management and budget revised the Standard Industrial Classification (SIC) codes to include a new major group 87 for professional and technical services. Before this, we were simply lumped under "other". This change is important to our industry because tax, trade, and other policy decisions often are based on SIC code data.

To illustrate the dramatic growth of the professional and technical services industry, I would like to cite some figures from 1982 census data and a draft paper detailing some rough estimates of the scope of the industry in 1987. I would note that these estimates were prepared by Dr. Jacques A. Gansler, a senior executive of a member company within the professional services council. Dr. Gansler found that in 1982, annual sales of the industry were $75 billion and projected estimates of 1987 sales were $165 billion. Employment in 1982 was 1.5 million but projected to be 2.25 million in 1987. Establishments in the industry in 1982 were reported to be 150,000 and projected at 200,000 in 1987. Although these comparisons are based on rough estimates, it is clear that the professional and technical services industry is a dynamic and growing one. While the professional and technical services industry represents a significant part of the U.S. economy, much still remains to be done to educate policy makers about the industry.

This growth reflects the complexities and interrelationships of the many systems which today are essential parts of our high-tech, information based society. In the case of Defense, I am certain that in your committee hearings you are constantly advised of the ever increasing complexity of our defense systems. The unique scientific, engineering, and other talents that are to be found in a modern professional and technical services firm are a response by the private sector to the demands of that complexity.

Let me now turn to specific areas of concern to the professional and technical services industry which stem from legislation or regulations affecting the Defense acquisition process.

DEPARTMENT OF DEFENSE (DOD) PROPOSED PROFIT POLICY

Probably no issue is of greater concern today to the professional and technical services industry than the proposed profit policy rule which DOD issued as an interim rule on December 1, 1986, for public comment. The effect of the rule is to change DOD's weighted guidelines method of determining profit objectives on negotiated defense contracts by placing increased emphasis on facility capital employed and contractor risk. Supposedly, the interim rule reflected congressional intent as set forth in section 9105 of the Defense Appropriations Act of 1987 and the related language in the conference report accompanying the Appropriations Act.

While the Framers of the interim rule of profit policy in DOD may understand the role of R&D and professional and technical services firms in the defense acquisition process, my impression from studying the rule is that they do not understand the business management aspects of those firms. If they did, they would not have issued the interim rule in its present form and sought to lump manufacturing firms and R&D and services firms together.

The Congress understood that there is a real and meaningful difference between these types of firms. In the statement of managers to the conference report for the DOD Appropriations Act, 1987, the Congress recognized that professional and technical services firms do not have investments in facilities comparable to manufacturing firms and that the assets of our type of companies are different. As I am sure you can appreciate, the assets of professional and technical services firms are their people and their skills, their collective innovativeness and brainpower. These human assets provide the imagination, the initiatives, and the problem solving abilities that bring about the technological breakthroughs which enable this Nation to maintain its lead in weapons technology and other defense systems vital to our security. To establish a process for determining profit objectives that is based only on a return on physical assets and does not consider this intangible and valuable human asset would be a grievous mistake. The human assets of professional and technical services firms provide vital services to DOD and are as critical and important to the defense industrial base of the country as are the plants and production lines of the manufacturers.

Without the professional services industry's "intellectual capital" to contribute to the design, testing, maintenance, operation, and use of our military systems, these systems cannot be developed to their full potential or used to their full capacity. Recognizing this, the congressional conferees developed report language to the DOD Appropriations Act which acknowledges the special circumstances of the professional and technical services industry:

". . . The conferees recognize that some types of firms, such as professional and technical services firms, doing business with DOD inherently are called upon to make less capital investment and may participate in projects with less total risk. It is the conferees' belief, that, notwithstanding this modified emphasis, any profit policy must ensure that firms performing satisfactorily for the Department of Defense earn a reasonable profit."

While the conferees explicitly directed DOD to take into account the unique circumstances of the professional and technical services industry, this was not reflected in the DOD's interim rule. Professional and technical services companies have commented in writing to DOD explaining why they consider the rule inconsistent with congressional intent and why they would suffer inequitable treatment under the rule in comparison to manufacturing firms. Representatives from the industry have met with DOD officials but have received no encouragement that revisions in the rule will be made to provide relief to the industry.

Very briefly, let me explain what happens under the interim rule. For manufacturing firms, contract profits would generally be reduced by one profit percentage point, from 13 percent to 12 percent—a reduction in gross profit of 7 percent to 8 percent on DOD contracts. Now for professional and technical services firms, the new profit policy would reduce contract profits from the previous level of 7 percent to 8 percent to the level of 4 percent to 5 percent. This 2 percent to 3 percent profit percentage point reduction means a 25 percent to 40 percent reduction in gross profits on DOD contracts. When you compare that to a 7 percent to 8 percent reduction for manufacturing firms, you begin to get some idea of the unfairness involved with this policy.

It is quite likely that, unless the current policy is modified, many CEO's in the professional and technical services industry will become selective in doing business with DOD. They will look hard and long at the DOD contracts for which they want their company to compete. Clearly, they will be considering the net profit left to their company after taking into account reduced Defense contract profits, the costs of extensive auditing and regulatory control involved in doing business with DOD, ordinary business expenses incurred in order to be viable and credible in the marketplace but not reimbursable by DOD, taxes, and other costs that they must deduct from contract profit.

To achieve technological and scientific breakthroughs and to maintain technological superiority over our adversaries, the companies in my industry need to make a reasonable profit in order to finance growth and to provide an adequate return on equity to their shareholders—the same shareholders who provide the capital a company needs for financing research and development, scientific activities, and expansion.

I am convinced this new profit policy will seriously affect the ability of professional and technical services firms to provide the innovative and technological "push" these firms have historically offered to DOD. The proposed policy is very likely to impair their economic strength, reduce their quality of services, and dampen their creative energies.

I understand why the administration, as well as the Congress, is seeking to reduce profits on Defense contracts and to implement a profit policy which will enhance productivity. I do not quarrel with these goals, but I urge that they be achieved through a broad, judicious, and balanced approach which recognizes the unique character of the professional and technical services industry, the lower profit margins of the industry, and its importance to the national defense.

It seems to me that a solution to the profit policy problem should not be that difficult. Congressional intent is clear—professional and technical services firms performing satisfactory work for the DOD should earn a reasonable profit.

Mr. Chairman, I believe that this subcommittee, in exercising its responsibilities for oversight of the Defense Acquisition Policy, can make an invaluable contribution to the solution of the profit policy issue. It can make congressional intent clear to DOD and urge the department to correct DOD's misinterpretation of the profit policy language. I would prefer to avoid urging Congress to enact any additional legislation on this issue, but if there are no other alternatives, I would argue for corrective legislation.

AN AGGRESSIVE RESEARCH AND DEVELOPMENT PROGRAM

Another area I would like to call to your attention is research and development (R&D). The importance of an aggressive R&D policy cannot be overstated—R&D is the key to our future, both in the commercial and defense areas. Since the end of World War II, the United States has depended on advanced technology to keep it competitive with its commercial trading partners and ahead of its military adversaries. Today, with so much emphasis being placed on American competitiveness as it relates to the foreign trade imbalances, it is essential that we do all we can to develop an environment where our creativity and talent for innovativeness can flourish.

Mr. Chairman, I know this subcommittee is deeply concerned that our adversaries are gaining technological superiority in a number of fields. The implications this holds for our military capabilities are significant. The statistics contained in the attachment to the statement you made at the first hearing are quite disconcerting considering that U.S. military strategy is based on the concept that U.S. technology will effectively counter Soviet numerical superiority in the event of war.

I am sure many of you have had the opportunity to read Tom Clancy's book, *Red Storm Rising*. Although fictional, I believe many aspects of the book parallel U.S. military strategy in today's world. We depend on the capabilities and innovation of our defense industry to maintain technological superiority over the Soviet Union. As one reads *Red Storm Rising*, you begin to appreciate the complexities of our advanced weapon systems—sonar systems for the P3C Orion, guidance systems for cruise missiles, Aegis technology for destroyers, and the list goes on. Research and development and test and evaluation are crucially important to the development, operation, and maintenance of these and other critical advanced technology systems.

Dr. Harold Rosenbaum, a member of the Defense Science Board, in testifying before the U.S. Senate Subcommittee on Defense Acquisition Policy of the Committee on Armed Services on November 13, 1985, said:

"The tech base . . . represents maybe 1 to 2 percent in terms of overall dollars of the total defense authorization. It represents perhaps the most significant part of the defense budget in terms of the future direction that the country is going to take. It supports the research, the innovation, it is the heart and soul of everything this country does to create a better defense structure."

I am certain we would all agree that an aggressive research and development policy is the key to maintaining technological superiority over our adversaries.

Unhappily, the Competition in Contracting Act has been, and continues to be, administered in a manner that tends to discourage unsolicited proposals and sole source awards, which experience has shown to be key elements in fostering a climate for an aggressive R&D Program. This issue was raised and discussed during the November 13, 1985 hearings before Senator Quayle's subcommittee. You, Mr. Chairman, were instrumental in trying to deal with this problem by having included in the DOD Authorization Act for 1987, section 923 which highlighted and extended the scope of non-competitive procedures for contract awards. This change, I believe, was designed to bring about the submission of unsolicited proposals containing new and imaginative concepts to enhance our defense capabilities and to assure the proposer that an award of a contract could be made solely on the merit of the proposal.

It was the hope of many of us that DOD, in implementing section 923, would do so in a manner which would encourage R&D and professional and technical services companies to submit imaginative and prospectively useful unsolicited proposals to

DOD. This, in my view, has not come to pass as yet. DOD was given six months in which to issue appropriate implementing regulations. That six months will end around mid-May, but to date, we have not seen or been informed about any forthcoming implementing regulations.

Through its oversight function, I feel this subcommittee can impress upon DOD the role the acquisition process can play in achieving an aggressive and meaningful R&D Program. By encouraging the appropriate use of broadened, other than competitive procedures for responding to unsolicited proposals, defense will find that the ingenuity, originality, and resourcefulness that is available in the R&D and professional and technical services companies will assure the technological superiority essential to our military strategy. Not infrequently, the bureaucracy needs to be reminded that the Congress enacts legislation because it believes that changes in the old way of doing things are needed and will benefit the American people.

While I am on the subject of an aggressive R&D Program, I would like to mention tha congressional practice of placing ceilings on IR&D/B&P funds. The IR&D/B&P Program often entails high-risk projects which many firms cannot afford to undertake without an equitable sharing with the sole client—the U.S. Government—for whom it is engaged in the R&D. While those who argue for these ceilings have seemingly valid arguments, I would urge you to look at these ceilings in terms of the broader significance for our defense industry and technology. The ceilings, in practice, become disincentives. They become points beyond which firms are not likely to invest in costly, high-risk projects. With ceilings on IR&D/B&P funds, you are, for all practical purposes, capping the scientific curiosity and ingenuity of the R&D community to which we must look for meaningful advances in our defense tchnological capabilities and weapons.

Mr. Chairman, the IR&D/B&P Program, and the way it is managed, is an important element in your subcommittee's concern with the defense industry and technological base and should be viewed from this broad perspective.

DETERIORATION IN GOVERNMENT-INDUSTRY RELATIONSHIPS

The area of government-industry relationships is a delicate one where both sides feel that they are the injured and aggrieved party. To some degree this is true, but neither side is without fault. The Defense contractor has erred at times, but "contractor bashing" and overregulation of procurement are not the answers. The solution is not to make that part of the private sector which provides goods and services to the U.S. military establishment the equivalent of a regulated utility. Our goal, I believe, is no different than the Government's. We seek to satisfy the needs of our Defense establishment by providing innovative and creative concepts, productivity enhancements, improved scientific and technical capabilities, and a responsive industrial base. At the same time, we need to make a reasonable profit if we are to stay in business and serve the military. I am fully aware that the phrase "reasonable profit" is where reasonable people begin to differ; but if we are to reach agreement, we must understand one another's activities and problems better than we currently do.

From where I sit, I often feel that the Government official who framed a particular policy or initiative was devoid of any understanding of how business in the private sector operates or how the market place functions. There is a long list of policies and initiatives I could mention. I have already described my concerns about the profit policy and R&D. Then there are such things as the ever growing list of business expenses which are not recoverable under Government contracts but are expenses a firm must incur in today's business world. Also high on my list is the extensive use of the audit and the growth in subpoena power in order to catch the occasional offender. There must be a simpler way to deal with the problem than the way we are presently going. Contractor bashing of another type is to be found in the drive to require the contractor to assume greater risks in the work it is doing for a demanding customer—the Defense Department. We are now being asked to do high-risk R&D with decreasing cost sharing participation by the Government.

I could continue to give examples of where the defense contracting industry believes it is being treated unfairly, and I am certain that some Government officials would dispute those arguments. We need to eliminate this adversarial environment that encompasses the Congress, the executive branch, and the defense contracting industry. I believe this subcommittee can play an important role in this process.

OVERSIGHT FUNCTION

Mr. Chairman, the final area of concern I would like to discuss today relates to the congressional oversight function, specifically, the oversight activities of the Senate Armed Services Committee and its counterpart in the House.

To my mind, as important as the function of the committee to recommend legislation are the functions of determining how the legislation is being implemented and how the American citizen is reacting to the legislation and its implementation. That is why I always avail myself of the opportunity to appear before this subcommittee when it is offered.

This subcommittee, and its counterpart in the House, can play an important and vital catalytic role by bringing together, formally in hearings and informally in your offices, representatives of industry and the executive branch on issues stemming from legislation. Congressional intent is often at the heart of the issue, and I believe that this can be clarified without affecting the management prerogative of the DOD. Let me give you several examples of what I have in mind.

As I alluded to earlier in my testimony, I believe the profit policy issue is an excellent example of DOD failing to implement congressional intent, as expressed in the DOD Appropriations Act for 1987. The statement of managers conference report language is quite succinct, but DOD has failed to provide satisfactory relief to the professional and technical services industry. In instances such as this one, it seems to me that the Armed Services Committees of both Houses have a responsibility to ensure that DOD is implementing, in a timely manner, the intent of the Congress.

I put emphasis on the word "timely" for a reason. Last year, through the leadership of Senator Bingaman and other members of the committee, two amendments were added to the fiscal year 1987 DOD Authorization Act as a result of testimony before Senator Quayle's subcommittee on defense acquisition policy. One amendment recognized the importance of quality over cost in the procurement and selection of professional and technical services. The other amendment dealt with unsolicited proposals by professional and technical services firms and states that the unique capability of the source providing the services should be an important consideration in the selection process. Both amendments are effective on contracts awarded after May 14, 1987. Today is April 9, 1987, about one month before the effective date, and I have yet to see any proposed regulations implementing the legislative changes. At this pace, after the rule changes are finally issued, public comments are received, and the legislative changes are affected, it may be sometime in 1988 before the changes are actually reflected in the actions of government contracting offices.

DOD needs to take actions to streamline the regulatory process in order to implement legislative changes in a timely manner—timeliness and responsiveness to change are imperative if industry is to successfully provide "cutting edge" tchnologies to our defense effort. Your committee, with its oversight responsibilities, can help bring about this highly desirable goal.

CONCLUDING OBSERVATIONS

Mr. Chairman, I would like to conclude my remarks by thanking you and your subcommittee for holding these hearings. They are timely and will focus needed attention on the state of our defense industrial and technological base.

Thank you for this opportunity to present my views on the defense acquisition process. I would now be happy to answer any questions.

Senator BINGAMAN. Senator Nunn, did you have any kind of additional statement?

Chairman NUNN. No, Mr. Chairman. Just catching up, thank you.

Senator BINGAMAN. Let me ask a few questions here to get started with this panel, if I could.

DEREGULATION

Mr. Trimble, in your testimony, which I found very interesting, you said that in a period in which we have emphasized deregulation, the defense industry has been turned into something approximating a public utility.

Could you indicate if this is a problem that's occured in the last 2 to 3 years? Or is it one that's been occurring for a decade?

What is the timeframe we're talking about and how much has the problem exacerbated in recent years?

Mr. **Trimble**. Mr. Chairman, I started in the acquisition field in 1951. What I see today has very little semblance to the way we conducted and handled procurements in the 1950s and 1960s.

The problem that I see started in the 1970s, and has picked up speed during the 1980s. I think it's characterized by the fact that we in industry find that we are regulated by more and more and in more and more different ways.

I talked about the criminalization of the process. I think that is an example. There are more and more items that are considered to be unallowable costs. But in the free enterprise process, they are costs that actually have to be incurred.

We find the Government asking us to invest more in items like special tool and test equipment, all of which we have to conform to, or else get out of the business.

And as you indicated earlier, the Government is really our only customer. So in most cases, we have to conform to these practices, these rules, or else not bid at all.

That has picked up speed, and certainly is something that has been of great concern to those of us in industry in the last 4 to 5 years.

COMPETITION IN CONTRACTING ACT

Senator **Bingaman**. I guess the effect of a lot of legislation that we've passed in this area in the last year has not really been felt because they're still working on regulations in it.

But the Competition in Contracting Act clearly has taken effect, and to what extent are there specific ways in which that act has tended to discourage innovation, discourage risk taking? Things that we need to go back and rethink about that legislation?

I think, Mr. Gross, your comments alluded to the general problem of disincentives to small firms taking risks. Can you trace it back to that act, or what do you trace it back to?

Mr. **Gross**. Mr. Chairman, actually, for the innovative subcontractor, we trace it back to a little more than a year earlier than that, with initiatives first by the Navy and then the Air Force aimed at spare parts procurement.

And then the disincentives were reinforced. I think the services are interpreting CICA as reinforcing that although in fact it doesn't—by the passage of CICA.

Specifically, the procuring services are insisting that every spare part in a weapons system have an identical—absolutely identical—replaceable part from more than one source; two or more sources.

Now, I said earlier that the innovative subcontractor often has competition. By the way, Defense Department studies say we amount to substantially less than 5 percent of the competitive problem. I would contend that we might represent 20 percent of the technology that makes especially our airplanes very advanced.

We compete by offering two devices that will fit in the same hole in an airplane, form, fit and function competition. We love to compete that way. You know, give us an envelope spec. Say, "Here is an actuator," "Here is a hole that I want a fastener through," "Here is a hydraulic gizmo."

Tell me what it has to do. Tell me its size, weight, performance. We would love to compete on that basis, anytime, any place.

The services are insisting that the only way that they will buy a spare part is if each one is identical to the original part, absolutely identical inside and out.

Senator BINGAMAN. This is a requirement that you do not think exists in the Competition and Contracting Act, it's one that they have written into it by regulation or by practice?

Mr. GROSS. More by practice than anything.

Senator BINGAMAN. The way they enforce the law?

Mr. GROSS. That is correct. CICA does not require competition for identical items. Actually, CICA, as I'm sure you know, provides very specifically for form, fit and function competition, formalizes that, I think, for the first time as a legitimate way to compete.

The logistics folks in the services want a simple system. You know, many books have been written about how to fight a war, and how important the supply lines are. I've talked to a few three star generals who say, "I can't complicate the supply system with multiple spare parts that fit in the same hole. I want one part number.

I won't argue with that. What I will argue with is, for the small percentage of the time that an innovative product is involved, the practice of forcing us to give up our trade secrets and our patent rights so that some other competitor can make exactly the same item when the market for that item doesn't support two suppliers. That's wrong.

And to say that even though we have a better device that will make a better weapon system, that we can't participate and we can't be on that weapon system, unless we're willing to establish a second source, that's wrong. In fact, you passed legislation to say that was wrong, but it's still being done.

Senator BINGAMAN. Do any of the rest of you have any comments on this general subject?

Mr. WILLIAMS. Mr. Chairman, there are things—this goes back to the question of legislative intent, and how things get transmitted, and the role that this committee can play.

As you recall, I'm sure, after the Competition in Contracting Act had been in effect for awhile, it became clear that it was being misinterpreted in some areas, particularly in the area of unsolicited proposals.

And the defense leadership in the House and the Senate wrote to the Secretary of Defense saying, there's been a misinterpretation of this, that there really was no change intended in certain areas; and particularly it said, we have no objection to your using broad area announcements, and then allowing people to submit unsolicited proposals on specific issues under these BAAs.

Some elements of the DOD responded positively and immediately to that. They took advantage of that. They put the word out to their contracting officers that they are permitted to use a BAA. These elements put out a general requirement, and then accept unsolicited proposals; and said you can in fact come back with a sole source procurement in response to that.

That word hasn't gotten out to everybody even yet, some year later after that letter went out. There are people who will still say to you, well, I saw that letter, but that letter is not the law. If I do what the letter says, and don't do what the law says, then somebody is going to get me, the news media or the Congress or my boss or someone.

We really have created an environment of considerable fear on the part of contracting officers based to a large extent on misunderstandings.

And so, again, I think this is an area in which the Congress, by working with the DOD and with industry, can help remove some of these obstacles which are more in the minds of some people than they are in either the legislation or the regulations, even.

INDUSTRY OF COMPETITIVE LOW COST MANUFACTURERS

Senator **Bingaman**. Let me just follow up on one other comment that you made, Mr. Gross, the comment that we're moving toward an industry of competitive low cost manufacturers without any ability to innovate.

In testimony from an earlier hearing, we had Bobby Inman make somewhat the same points, saying that we had created an acquisition system that gave priority to cost, bringing cost down, that was his primary thrust, and the ability to innovate, and the ability to get technology into the field quickly.

Those two values had been lost sight of. There wasn't a whole lot of discussion in what you said about the timeliness with which we go forward here. Is that another aspect of it? Maybe you referred to that, and I just wasn't paying that much attention.

Mr. **Gross**. I didn't refer to it, but it certainly is, for the subcontractor, it is less of an impact than probably for the primes.

But I can relate some experience as a subcontractor where we've sold spare parts to DSC, the Defense Supply Agency in Philadelphia, which is part of DLA. We're typically sole source, as are most innovative subcontractors.

I want to point that out. That's the way we are. Until our market gets big enough for someone to say, I'm going to go after a piece of that market and then they do, we are sole source.

It used to take something like 90 days from the time we got a request for a proposal from DSC to the time that the order was placed and we'd start going, getting our factory going to make the parts.

I would say that it averages something like three times that now. We can measure this. You know, we're the only ones that get the request for quote, and we're the only ones that get the order.

Senator **Bingaman**. Well, what causes it to take three times as long?

Mr. **Gross**. I think CICA has put the fear of God in any procuring officer, and when he's up against a sole source procurement, he has got a problem. He has got to put justifications on top of justifications.

He knows we're the only supplier, and the whole system bogs down. I will tell you an even worse case.

We had a situation, the same agency, where they put a cost analyst on it, and this cost analyst came to the conclusion that our price was twice what it should be. He looked at the part, it looked like a simple nut and bolt, and decided that from what he knew about manufacturing, it should cost half the price.

We provided a whole data package and we went back and forth for 2 years. We had an RFP. We couldn't agree on a price. Could not go on contract. It finally got up to the commanding general of DLA.

He thought that we weren't delivering. Heck, we weren't even on contract because we wouldn't agree to the price. And we got from, I'm sure it was unintended, but we got some words from low level procurement people that were nearly threatening.

So I picked up the phone and got on an airplane and saw the general in charge of DSC, and we quickly resolved this thing.

But it is paralysis by analysis, down at that level. Those people are afraid. I feel for them, those procurement people. They are trying to do a job, and they are afraid.

Senator BINGAMAN. Senator Nunn?

Chairman NUNN. Mr. Chairman, I just want to thank you for your leadership in this area.

This is the first year we've had this subcommittee. And under your leadership, it's gone a long way. We have a long way to go, but I think giving a forum for our people that are involved in the technology base of America, the industrial base, and the service and technical service base is absolutely essential.

We don't anticipate that the problems are going to be solved this year; we're just scratching the surface. I do think it'll be a long term look, and an intensive look.

So I want to thank you for your splendid leadership. We're going to be looking forward to your subcommittee's report at the full committee.

AUDITORS

I'd just like to ask one question. I hear so many complaints about the number of auditors out there. I had one company official tell me, he counted up and at one point there were more auditors than he had employees in the plant at that particular juncture.

Are those complaints valid, first of all? Second, are we talking about CPA type auditors, or are we talking about the whole apparatus of quality checks and so forth?

And the third part of that question is, when did it start getting so bad? Is this recent, or has this always been the case?

Mr. TRIMBLE. I would like to respond to that. When we talk about audits and reviews, Senator Nunn, we are talking about the whole spectrum of contract administration people from the Government that come into our plants.

We have taken a detailed analysis of our Orlando facility, as did a group under the Packard Commission. They clearly indicated there were duplicative audits.

In fact, Mr. Vander Schaaf, when he was here on the 31st of March, acknowledges the fact that he looked at it. When he commented on looking at one of the facilities, it was at our Orlando facility. And I think Mr. Vander Schaaf said that out of approximately 11 different programs down there, 7 in his judgment had had duplicative audits.

He also made it very clear, and the record should show, that the CPA type auditor from the DCAA or maybe even from his operation, was not the principal activity or the principal auditor to which we're referring.

We are referring to the whole spectrum of people who parade into the plants. We believe that at the Orlando facility it costs us $16 million a year to merely follow and track, provide information and data.

I would be the first to say that the Government, as our principal customer, and the taxpayer, does deserve clear insight into what we're doing.

We do not, however, think it is appropriate to have one agency come in and make a review; only a month later, another agency come in and review exactly the same data.

There is a very definite need for coordination between the reviewers and the checkers and the auditors that come into our plants.

Chairman **Nunn**. Where would you bring that focal point? What level of management would you make responsible for that?

I assume what you mean is both managing and eliminating redundancy.

Mr. **Trimble**. The Department of Defense Inspector General has this as his responsibility, according to his charter or the mandate from Congress.

Through my understanding, from what Mr. Vander Schaaf has testified, there have been others that have indicated that the new defense acquisition executive should have that responsibility.

In my judgment, if I had to vote, I would put it in the office of the acquisition executive, because I think that he has a much broader responsibility for operation of the system as opposed to an Inspector General.

I do not like to see the Inspector General operational. I think that this puts him in the operations, if he were to have control over it.

And so I would vote in favor of that, although according to Mr. Vander Schaaf, they do now have that responsibility, and I do not think that they are fulfilling their responsibility correctly.

Mr. **Gross**. Senator, could I comment on that?

From a subcontractor's point of view, first of all, in my own company, you asked when. Three years age we had 2½ audits in a year.

60 SEPARATE ADUITS

This year we will have 60. The volume is not that different.

Chairman **Nunn**. Sixty?

Mr. **Gross**. Yes, sir.

Chairman **Nunn**. Separate audits?

Mr. **Gross**. Yes, sir. More than one a week. That is a big difference, I think. Our volume has gone up, maybe, 15 percent in that time.

PRIME CONTRACT CUSTOMERS

Second, I would like to comment on audits on prime contract customers. We deal with every single airframe company in the world. When they go through a core audit, which is a massive thing, those companies stop.

I doubt if they're going to tell you that, but I will tell you that. Those companies stop for weeks before getting ready, and during it, you just don't conduct business.

When you see a core audit going on in a prime contractor, more than once a year, you wonder, you know, what good is this doing?

Beyond that, I would like to describe the audit situation by using an analogy. In my hometown, if we doubled or tripled the police force, and we said, for good reasons and maybe with good intent, "You know, your job depends"—keeping your job, all these new policemen we hire—"on how many people you nail at whatever, and we'll give you quotas." You know they have to nail some people or they're not going to keep their jobs.

At some point, that starts being destructive rather than constructive. I think the degree to which we do this must be very carefully managed. And I really think the degree is too far.

Now how you find exactly the right way is probably by letting the pendulum swing. It was probably too far this way. Not it is too far that way.

I think we need to bring it back.

Chairman NUNN. When you say 60 separate audits, is that one auditor in there, or is this a full audit of a particular area? How do you break that down?

Mr. GROSS. Generally—let me tell you how that happened.

Three years ago, as you know, the audit price threshhold was $500,000. It was then brought down to $100,000. Even when it was $500,000, there was a provision in there to allow the contracting officer, with little trouble, to bring it down to $25,000.

Conversely, even when it was $500,000, he could waive it, and frequently did, even if the contract price was a million dollars or two million dollars, based upon good data.

And that frequently happened. The audits I'm talking about are all on individually priced sales. And some of them are below $100,000.

On top of that, we're being audited by prime contractors, DSC, and DCAA. It is a bunch of different things.

Chairman NUNN. Thank you.

PROFIT POLICY ISSUE

Senator BINGAMAN. On the profit policy issue, GAO has got a proposal to have an office outside DOD with responsibility to collect and analyze defense contractor profits, both on military and commercial work, as I understand it.

Mr. Williams, you testified about the proposed profit policy rule that DOD issued in December. Do you have a comment, or any of the rest of you, on this idea of GAO's to have this additional layer?

Mr. WILLIAMS. Well, Senator, my understanding is that the GAO is primarily a creature of the Congress, and so I suppose they will do whatever you all want them to do.

Senator **Bingaman**. I don't know why. They never have. [Laughter.]

Mr. **Williams**. I suppose that the political system being what it is, it is always going to be necessary for the Congress as well as the executive branch, to have some set of figures that we could all use as to what's going on in terms of the profitability and the cost-effectiveness of firms doing business with the Government.

Whether the GAO is the right place to put it or not, I don't know. The thing that disturbs me about not only the GAO proposals but other proposals is that we're going to have to be very careful that we don't get ourselves very confused.

Even today, when we talk about profit, people use different numbers. Some people use return on sales; some use return on equity; and some use return on assets. Each quotes his or her numbers. Of course you get very different and sometimes large numbers.

Our return on sales is very small. Our return on equity is very respectable compared to some other firms and other types of businesses. It's not surprising, given the kind of business that we're doing.

The problem seems to stem from the fact that many people don't think that people should make any profit at all if they're doing business with the Government. That seems to be the underlying approach of some of the attacks on corporate profits.

I am far more concerned about that philosophy than I am about who is keeping the records, or even about what the final numbers turn out to be.

It is a simple fact, and many people go public to the contrary. that it is more profitable to do business in the private sector and overseas where you don't have the restrictions that we have in the Government contracting arena.

So why do people continue to do business with the Government? Because it is a good client in most cases, and in our case, very, very innovative and exciting technical things are being done in the Government. That is why our people want to be there.

But I don't think that is a good enough reason for saying that we're not entitled to a fair profit. I think you're entitled to know what's going on. Whether you want the GAO to do it for you or not, I don't think I would choose to get into that debate.

Senator **Bingaman**. Do any of the rest of you? Mr. Trimble?

Mr. **Trimble**. Yes, sir. I think that we as a Nation need to analyze what has driven the so-called reform effort.

There was a lot of publicity a few years back about the problems of dishonesty, and we still have, unfortunately, some publicity in this area.

But an effort to make the system more honest was certainly a driver.

Another driver was that of reducing the cost of our weapons. And I think that this is entirely appropriate, and there have been measures taken to achieve that. But there is another driver that I think is very important that we need to understand, and that is that as a Nation, we are troubled by deficit spending.

We would like to have an increased defense capability, but we would like to do it at a price that is lower than what we think is appropriate to allocate for this particular effort.

The budgetary considerations and problems have driven a lot of what has occurred. It is quite likely, and I think entirely proper, for the Department of Defense to have conducted their defense financial analysis and investments review, the so-called DFAR.

DFAR came to the conclusion that profit levels were appropriate for American industry. However, there were interpreters that said they didn't like the data base, or didn't like the conclusions reached, and as a result of that there was pressure put on the Department of Defense to lower profits across the board, as Mr. Williams has indicated, by a factor of 1 percent, which has been inequitably adjusted over the various industry firms.

The point that I would like to make, Mr. Chairman, is that before we stop and look at why we are expected to have lower profits, we have to realize that as a Nation—and I think the Congress has been a part of this; the General Accounting Office has been a part of this, has said, in effect, the defense industry firms are going to have to share a greater portion of the burden.

The essence of my testimony to you, that this committee providing oversight here, needs to understand what is happening in terms of the defense contractors picking up a greater share.

And you have to, we think, make some type of judgment and determination as to what is going to be the long term effect. We think the long term effects are going to be serious, and that we have to, as a Nation, stop and analyze whether or not this idea, that the defense industry firms are going to bear a greater portion of the burden of defending the Nation, is in fact an appropriate one.

Because we may be paying the price for it in the year 2000.

Senator BINGAMAN. Thank you very much.

Senator Nunn, did you have any additional questions?

Chairman NUNN. No, thank you.

Senator BINGAMAN. Why don't we go on with the second panel. Let me just indicate to these witnesses that you raised some very important issues here that do require continued oversight by us.

We will plan to exercise that oversight as aggressively as we can, and hope that we can maintain the congressional intent, as these things are implemented.

So thank you all very much. I appreciate it. And if our second panel could please come forward.

Michael Rich of RAND Corp., and Harlan Ullman of the Center for Strategic and International Studies.

We thank you both for being here, and appreciate your patience in waiting for us here.

Dr. Ullman, do you want to go ahead and start, and then Dr. Rich?

STATEMENT OF DR. HARLAN ULLMAN, DIRECTOR OF POLITICAL-MILITARY AND MARITIME STUDIES, CENTER FOR STRATEGIC AND INTERNATIONAL STUDIES

Dr. ULLMAN. Thank you very much, Mr. Chairman.

It is clearly a great honor, and a greater responsibility, to testify today. It is a great honor, because I think that this recognizes that there has been some worth in the study we've just completed. But it is also a greater responsibility because my assessment is that despite all the legislation and other acquisition reform that has taken place to date, the defense acquisition process, in my view, is still in very serious trouble, and indeed, crisis may not be an inappropriate description of the status of today's acquisition process.

That may be a very surprising assessment because, given recent testimony, and recent actions which have been very positive, such as establishing enterprise programs and things like that, it seems to me that this broadly subjective view is probably something which flies in the face of conventional wisdom.

I would like to make my remarks in three parts to demonstrate why I believe the situation in acquisition is serious.

First, I would like to forecast the consequences for national security of inaction, or insufficient further action, in improving the defense acquisition process.

Second, I think it is important to describe briefly how we got to this condition and outline what in my view are the most serious, overarching problems that we face concerning acquisition.

And third, I wish to present three broad recommendations for improving the acquisition process.

Now in doing this I would like to make a few disclaimers. I speak for myself, not the members of the acquisition study. I am going to look at things in terms, generally, of an overview, but I will address some specific points, and will be delighted to respond to specific questions you may have. In all this, there are no magic cures or easy solutions. What is needed is comprehensive understanding of the problems, sufficient time to allow corrective action to work, and the need for comprehensive solution. I would like to make available for the record a copy of the CSIS report on Defense Acquisition, and acknowledge our gratitude not only for your assistance, Senator Bingaman but for your distributing this to your Members, your fellow Members of the Senate.

We are most grateful, and I appreciate that, Senator.

Let me begin with the consequences of inaction in improving further the defense acquisition process. Or, to phrase the issue in a Talmudic like question, to ask why today is different from earlier days, since we have always seemed to have severe problems in buying weapons and goods and services for the national defense?

And, in so doing, I am not aiming to ascribe culpability or responsibility to this particular Congress, this particular administration or this set of defense industries. What we have is a combination of events that have taken place over the past 10 or 15 years which have reinforced, if you will, the inefficiencies that are inherently part of the whole political process.

The first consequence, and perhaps the Damoclean sword which should get our attention, is that a combination of frozen defense budgets, particularly when those freezes reach outlays which they will—Gramm-Rudman notwithstanding—and the current way that we have structured our military forces, means that an overall contraction in U.S. military capability in terms of overall readiness and numbers, of 25 or 30 percent by 1990 or so is a reality; that we will see, in my view, a profound contraction in our aggregate military capability.

Second, the annual costs of oversight to the taxpayer of this defense acquisition process are probably close to $20 billion a year; that they are growing, and by our records, have probably doubled since 1981, and certainly since 1982.

The question is, can we afford all this expenditure from the public treasury for this kind of oversight?

Senator **Bingaman**. Now, what would be included—let me just interrupt for a second—what you would include in those costs of acquisition oversight? Are you talking about the budgets of the various agencies?

Dr. **Ullman**. Absolutely. I'm talking about investigators, audits, inspections, the numbers of visits, the amount of money that has to be put up, not only for those visits, but, for example, by companies responding to this allegation in kind with people and personnel.

We have discovered in a number of companies that the on-side inspections and visits by Government personnel in many cases have doubled. In one company visits went from 20,000 a year to 40,000 a year. This is in the last 2-year period.

The cost of all that, for whatever reason, have reached extreme proportions.

Third, the research and development and technology industry bases are eroding and are being squeezed. Now, we don't have any good, hard analysis to demonstrate this point, but I should just like to offer implicitly the case of the shipbuilding industry, and note that in this era of the largest peacetime naval building program since the Vinson-Trammel Naval Act of the mid-thirties, our shipbuilding industry is in crisis.

Now, that may not apply to all other sectors of U.S. defense industries, but it is something that we should not ignore, even if the example is an anecdotal.

Serious litigation, future cost overruns, and related problems are very, very likely. I think it is fair to say that there have been overzealous enforcement of both the criminal and civil codes in defense procurement by the Department of Defense.

We can expect further program delays and stretch-outs. I cannot forecast the cost except to assess that there are likely to be extremely expensive additional expenses in time and money.

Now the key result of all these consequences, in my view, will be further erosion of public trust and confidence, and loss of support for maintaining a strong national defense.

And to make that point further, I'd like to paraphrase from the Packard Commission using one of their appendices in terms of their public polls.

It seems to me remarkable that these polls found that waste, which is to say, poor management in the eye of the American public, and fraud that is illegal activities in defense spending, are second in seriousness only to the budget deficit.

And that almost—in the public view—half of the defense budget is lost to waste and fraud.

It seems to me these polls demonstrate public attitudes and suggest the serious possibility of even further erosion in support for large expenditures for national defense.

How did we get here? Senator, you know this better than I. It is a function of process and history. The overall political process and defense process is inherently inefficient for reasons which we all understand.

Over the last 15 years or so, congressional and executive relations have reflected major traumas and major events such as Vietnam and Watergate, so that the result was a contest in power, responsibility and authority between the two branches. As a result, distrust and lack of confidence became mutal and widespread.

Within the Congress, because and despite these factors and with the demise of the senority system, oversight grew. Establishment of four separate funding actions, the annual fiscal actions of authorizations, appropriations, budgeting and sequestering, became part of the process, which added cumbersome layers.

And, then really, the *cause celebre,* or the catalyst which really got all this chloresterol stirred up in a big way, was the huge amount of increased defense spending which started in the last years of the Carter administration and continued during the first 4 or 5 years of the current administration.

This spending overloaded the collective capacity of government, that is all branches of government, to manage the process effectively and efficiently, and to maintain the public confidence.

So as a result, oversight grew, I would say uncontrollably. The huge triple deficits of budget, balance of payments and national debt, have further exacerbated executive-legislative relations over selling national priorities.

Popular support for continuing the defense buildup in terms of spending more money has disappeared, and what has occurred is a very vitriolic atmosphere among the branches of government and industry.

While I am not an expert in the history of these affairs, it is certainly the judgment who have been around for a lot longer than I have, that the atmosphere in the entirety of defense acquisition is probably at the lowest point, the worst point, that it has been, perhaps ever.

Now, against this background, five general problem areas remain, and these are where we ought to focus our corrective action.

The first has to be with the requirements process, that is, how we decide what capability we need, why we need it, and what that capability is supposed to do.

If we can do better in that requirement process, which is at the very front end, it seems to me that we can drive some of these costs down, and make a much more rational system. I will get back to some solutions in just a minute. I want to highlight these points.

Second, is the issue of program variability, or program instability. There is no long range, stable planning horizon, for establishing the fiscal basis. This point is one which the Packard Commission stressed as perhaps the largest single problem. Without a long range planning horizon which enables someone stable and certain planning, programs get stretched, reduced and in any event, costs go way up.

In terms of laws, rules and regulations, I think the previous panel made the point that the costs of all this are growing dramatically.

In terms of the public-private sector interface, what I mean really is how we conduct our business between and among the private and public sector.

A factor such as competition, fixed price contracts, while sounding good, and overzealous enforcement of law, have gotten out of hand and further exacerbated basic ineffeciencies of the process.

In the area of personnel, you can pass all the laws and fiats and legislative directions, but unless capable, knowledgeable people are in acquisition, like in any other area, the process is not going to work.

What are my prescriptions? What do I think we ought to consider?

First, I believe we have to take the longer view. We are not going to fix the acquisition process overnight. I think 1989 might be a point where if there could be a comprehensive, corrective program that was ready to go for the next Congress and next administration, there might be valid political reasons for using that as a jump off point.

That does not mean we have to despair until then. But 1989 might be a good starting point leading to some very productive changes.

I think we need to take the broad view, and focus on the key problem areas. In terms of the requirements process, I think clearly this is where DOD has got to take the lead with congressional oversight.

In that regard, it seems to me that in the new charter, or the charter of the new Under Secretary of Defense for Acquisition, one of his most important responsibilities is the validation of program acquisition requirements.

It seems to me that ought to be a task that he should be directed to take on centrally, to try to ensure that the best possible job is done, focussing on the requirements at the beginning of each program development stage, to ensure that they are neither over-specified or under-specified and that we have not tried to seek technologies that would disinvest gravity or other physical principles, to us ensure that the program starts with the highest possible chance of success.

In terms of program variability and program instability, DOD and Congress must work together to come up with realistic bases for fiscal estimates of planning.

Now that is always going to change in this political recess but it seems that we always seem to get in wrong. The Carter adminstration underestimated its fiscal needs and what actually was going to happen. The Reagan administration has overestimated. The results are greater costs for the taxpayer.

It seems to me that Congress and DOD can set some kind of line which will be reasonably close but not perfect.

In terms of laws and rules and the public and private sector, and personnel, let me defer corrections to those in terms of my three overarching recommendations.

First, both I and the report recommend that a congressional commission be established to examine the role of Congress, with several foci.

Second, Congress must try to reduce these four concurrent processes of authorization, appropriation, budgeting and sequestering, to the degree that is possible; to try and unlayer the layering; to take a look at codifying and simplifying acquisition rules and law in concert, perhaps, with the Office of Federal Procurement and the Department of Defense.

So that, rather like with the tax bill, some codified and then simplified, or some simplified and then codified, series of laws and regulations, which can perhaps reduce some of the contradictions that exist right now, can be brought to bear as quickly as possible; perhaps that would be a year or two.

In terms of personnel, upgarding personnel in acquisition is extremely important. If you have not seen the report that GAO released in May 1986, it makes good reading. There were some very specific recommendations in there about reclassifying the structure of the civil service to professionalize acquisition, for in-housing training, and making better use of Public Law 313 for increasing paygrades. That, to me, is extremely important.

Finally, some mechanism of followup must be established. For all the worth of the Packard Commission, there really is no followup. We have recommended oversight through a general advisory board on acquisition, not dissimilar to the general advisory board on disarmament, which would report to Congress and to the President on how these acquisition problems are being resolved.

Now, clearly, given national priorities and competition among social, economic, and health and other issues, the deficits, why should acquisition be such an important point.

Senator BINGAMAN. Let me just interrupt a moment. I'm going to have to run to the floor and vote.

We will just recess the hearing for about 10 minutes.

[Recess.]

Senator BINGAMAN. Thank you for waiting. I apologize for the interruption.

Dr. Ullman, why don't you go ahead and complete your testimony.

Dr. ULLMAN. Thank you, Senator. Fortunately, I'm on my last sentence.

Senator BINGAMAN. I didn't mean to cut you off in midsentence.

Dr. ULLMAN. It gave me a chance to reconsider some of my thoughts. I'm grateful for that. [Laughter.]

The point I was trying to make, sir, is that given all of our competing national priorities, ranging from social, economic ones, the three deficits, health and other issues, why should acquisition assume high priority among those other very worthy concerns?

In that larger case, the debate—or should I say, in the case of acquisition, however, the debate is not over priorities; it is over process.

We are going to buy a great deal of defense goods. We are going to have an acquisition process.

I am optimistic that the process can be made more effective and efficient; from a national security perspective, it must be.

Thank you very much, Senator.

Senator BINGAMAN. Thank you very much. We appreciate that.

Dr. Rich, why don't you go ahead, then I will have some questions for each of you.

STATEMENT OF DR. MICHAEL D. RICH, VICE PRESIDENT, RAND CORP.

Dr. Rich. Thank you, Mr. Chairman, for the opportunity to appear.

I am the vice president for national security research at RAND. In that capacity, I direct the National Defense Research Institute, which is the federally funded research and development center that the Office of the Secretary of Defense sponsors at RAND. But, like Dr. Ullman, the views I'm going to express today are going to be my own.

Senator Bingaman. You might pull that microphone up a little. I think some of the folks in the back would have an easier time hearing.

Dr. Rich. The views I will express, although my own, are based on my reading of the more than 25 years of RAND research performed for a wide variety of Government sponsors. We've recently summarized that work in a report that we've provided to the committee and to the staff.[1] And we have additional copies here today for anyone who is interested.

What I will do today is not read the statement that I've provided. You have that, and can refer to it. I'll briefly summarize it, though, outlining both an approach to acquisition reform that we've developed, based on our research, and describe a prescription for changes in the acquisition process.

I didn't intend it this way, but it turns out that much of what I will have to say about the past will run counter to conventional wisdom, certainly counter to many of the things you're heard today.

It also turns out that much of what I'll say about the future, in terms of a prescription, will also be very different from the types of things the Packard Commission has said, and the types of things that the Congress and others involved in oversight of the defense acquisition process are pursuing.

The first point I would make is that acquisition reform from whatever source should avoid misconceptions about the past, and I think these are numerous.

The traditional measures of success of an acquisition program, of course, are cost growth, schedule slippage, performance shortfalls, and fielding times.

Those measures don't tell a complete story about success, of course, but taken together they do provide some important indicators of how we're doing.

Our research, I think, has shown fairly clearly that Government and industry both, in combination, can claim at least modest improvements over time in terms of success of acquisition programs measured along to these dimensions. And that conclusion, I think, is contrary to the usual assertion that defense acquisition has become progressively less effective.

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[1] Michael Rich and Edmund Dews "Improving the Military Acquisition Process: Lessons From RAND Research," R-3373-AF/RL, February 1986.

We have documented the observation I just made in numerous reports which are available to you. Let me just summarize very briefly what we've found.

We've found that cost growth for major weapon systems programs has declined steadily from the 1950s. It was better in the 1970s than it was in the 1960s, and it's been better at the midpoint of the 1980s than it was in the 1970s.

Defense programs generally experienced less cost growth than comparable nondefense programs. This of course was a point picked up by the Packard Commission as well. Sometimes that difference is very great.

There has been less schedule slippage recently than in earlier years. In the 1970s performance shortfalls were fairly close to zero, on average, although some individual programs, of course, experienced considerable performance problem.

And there really has been no lengthening at all of the heart of the acquisition process over the past three decades.

Now let me quickly attach a number of caveats to those generally positive conclusions. We've been unable to separate the many possible causes of lower cost growth that we've been able to measure. So we don't know the extent to which, for example, this approval stems from better estimation on the one hand, or better cost control on the other; and of course, there are interactions between those two choices.

The second caveat is that we focused in the acquisition world mainly on development cost growth in the past. And we've recently uncovered information, as have others, that we need to deal more seriously with production cost growth, and stop the exclusively focus, or relax the exclusive focus, on development cost growth.

And finally we focused in the acquisition community, mainly on functional performance shortfalls. And those are the ones that are hard to find on average.

We need to deal now with other types of performance shortfalls, shortfalls relating more to the operational suitability of a weapons systems, its reliability and maintainability.

What then do we make of our observations about the past? Well, despite very real instances of troubled programs, the defense acquisition process has been much more successful than many critics have claimed and as a consequence, I think, we want to resist proposed changes that are based on false premises.

I'll give you one example. Proposals to compress development and overlap development and production, because of mistaken notion that we have been taking longer and longer to reach the high rate production phase of our system.

That is just not true, and we ought to be cautious about proposals that are based on that premise.

But having said that, and despite this past record of what I believe to be improving performance, the acquisition process does require major changes, in my view. And this is mainly because of four trends that we've described elsewhere I'll just summarize them here.

One is the changes that we see in the enemy threat, principally the geographic expansion and its qualitative and quantitative improvements over time. This has materially changed the design challenge facing our industry. And I think this the most important of the four trends.

Another is the resource constraints and uncertainties that the other witnesses today have talked about.

A third, which hasn't been mentioned, is our longer and longer retention of weapons systems in our operational inventories, and the fewer and fewer new platform starts that we plan and can afford for the rest of the century.

And the fourth is the increasing difficulties that we are experiencing producing weapons systems at affordable rates.

The implications of these trends, we believe, are clear. And they're the ones that should guide our reform efforts.

So the conclusions that we've drawn is that reform efforts ought to have three goals, three principal objectives.

The first is to strengthen the process by which combat subsystems, not platforms only, are developed and used to upgrade fielded weapons systems.

The reason for this is fairly clear. We have very few new platform starts scheduled for development for the remainder of this century. The principal means for responding to the threat, and dealing with our obsolescence problems, will be upgrades, not new systems.

We do want to, if we can, increase the number of new system platform options, but I don't believe that number is ever going to be high enough to be satisfactory.

The third goal ought to be to enable our defense industrial base to produce efficiently, at usually low, but frequently changing, rates of production, which I think is the unalterable environment of the future.

With those goals in mind, we have formulated a strategy for acquisition reform, which we have recommended to our sponsors in various forms over the years.

It is, again, like the other things I will say, detailed elsewhere.

The strategy consists of eight separate elements. I'll list them in a moment. None of them is novel, although each of them is currently an exception to general practice, at least in emphasis.

So we regard the lack of novelty as a strength and not a weakness.

The strategy does, we believe, have wide applicability across a range of military systems, but it is not a panacea.

Let me run through the strategy elements for you, and then just say a word about a few of them.

The first is consistent with observations that Dr. Ullman and his study group and others have made, and that involves improvements in the requirements formulation process. And we make five specific recommendations about that.

The second involves making the early phases of the development process much more austere, changing the way that requirements are actually expressed and articulated to the design community.

The third, and this represents a significant departure from current experience, is to adopt a strategy or an approach that we call maturational development. It involves developing important subsystems, principally combat electronics, separately from the development of the platform.

This is something that is done with turbine engines, but not with electronics for the most part.

The fourth item is to encourage austere prototyping, and we're pleased that that was one that was picked up by the Packard Commission.

The fifth is to use an approach that we call phased acquisition to improve the transition from full scale development to full scale production, which we think is not done well today, across the board.

The sixth, and this is another major departure from conventional wisdom, is to focus major attention on upgrades.

The seventh is to encourage plant modernization by means of computer integrated and flexible automation.

And the eighth and final element of this particular strategy is to continuously evaluate the effects of acquisition policy changes. (This is sort of a technical or analytic analog to the advisory board proposed by Dr. Ullman in his study.)

Now let me just provide a bit of elaboration on what I regard to be the most distinctive elements of that particular strategy, the first of which is the recommendation that we adopt a strategy or technique of developing a maturing important subsystems separately from the platforms that we develop.

As mentioned earlier, for the foreseeable future, the principal way our Nation is going to modernize our forces will be via upgrades to fielded systems; not new systems.

Currently, the full scale development of electronic subsystems is begun well after the full scale development of the vehicle or the platform itself.

We've found in many of our studies that for sophisticated electronic functions that are now increasingly critical to the combat success of the weapons system, the traditional style of a single iteration of development doesn't provide enough time for an avionics or an electronics designer or developer, nor the integrator of that type of equipment, to fully ensure that the equipment meets the required levels of reliability and maintainability.

We just don't give the development community enough time to do that.

What maturational development, which is the name for the technique we have explored, would do is to decouple, to separate, the development of the platform from the development of a critical electronic subsystem, like the headup display, the inertial navigation system, the fire control computer, the radar, and so on.

That would allow a needed head start for that type of equipment. It's fairly clear that we can achieve the required functional performance capabilities within a single cycle of development.

But we don't usually do very well with regard to reliability and maintainability requirements. What we would do in this particular technique is to freeze the level of functional performance at the end of the first cycle; and in the extra time made available by the approach, the subsystem would be subjected to as many additional cycles of development as necessary to attain the required level of reliability and demonstrate the required capability for fault diagnosis and isolation.

And as I say, this represents a fairly significant departure from current practice. But the importance of subsystems and upgrades, I think, requires increased attention to its merits.

The second recommendation that I might elaborate on is the one that I've called phased acquisition (to improve the transition from development to production.)

The recent emphasis on operational test and evaluation is a major step forward, but testing is not enough. The test results must be exploited before high rate production begins. And typical schedules simply do not permit this.

No matter what type of program you look at, I think you'll find three observations that we've found in our examination of programs.

The first is that high rate production decisions almost invariably are made before the end of testing, sometimes before the onset of operational testing.

Second, the user generally takes delivery of a large number of units before completion of testing.

And third, I think you'll find that this pattern exists whether or not prototyping is used in the earlier phases of development.

Continued failure to exploit test information will clearly negate the benefits of more thorough testing, and will negate any benefits or expected advantages of more use of prototyping.

What is needed instead is a longer period of low rate production during which corrective design actions can be made economically. And this is a strategy we've worked on quite a bit, and we've called it phased acquisition.

Again, it would be an exception to general practice today.

The third one is to focus greater attention on upgrades. This is something I think should have received a stronger emphasis or a stronger focus in the Packard Commission report.

The increasing importance of upgrades requires more than just changes in the subsystem development process. It requires that the services begin to collect engineering information throughout the operational lifetime of the system in realistic settings, something that's not done consistently today.

The acquisition process should also encourage, in an explicit fashion, upgrades in parallel and in competition with new system programs. And this is a type of competition or rivalry which I believe promises even greater benefits than the usually much more costly method of supporting two producers or two prime contractors through full scale development of new systems, something that we think has mixed blessings.

And finally, let me just comment on our recommendation that we begin to encourage plant modernization. In general, defense procurement relies on some of the oldest manufacturing plant in our industrial sector. And it turns out that the rate of investment in new equipment, in new production equipment, for defense products is quite low.

Failure to modernize, we believe, goes a long way to explain high production costs, very long manufacturing flow times, and limited surge capabilities that characterize much of defense procurement today.

What I think is needed is substantial investment in new equipment that can quickly shift from item to item, and produce very small quantities with differing designs with nearly the same efficiency as traditional production lines producing large quantities of a single item.

Those are the types of production lines we have today, but we don't have that type of marketplace anymore; we don't have that type of demand.

The services should begin to emphasize or increase their emphasis on flexible production capabilities; that's one way to do it.

But the DOD needs also to develop ways to stimulate investments in the types of flexible plant that will be increasingly necessary.

I've just tried to cover a few parts or elements of our strategy. Let me tell you the reasons why I think it is distinctive, and in doing so, perhaps highlight for you my own opinion about what is wrong with the popular prescriptions for acquisition reform.

I think the first shortfall is that there is insufficient appreciation of the importance of upgrades. The principal means of modernizing our forces to counter improvements in the threat will not be new systems, as in the past. Yet the reformers of the acquisitions process really pay very little attention to what are very big problems associated with generating promising subsystem options and replacement options, and the process by which fielded systems can be upgraded.

The second shortcoming, I think, is an inadequate amount of attention to the underlying acquisition process itself. The Packard Commission emphasized organizational and personnel questions. It actually paid relatively little attention to how the necessary steps in the acquisition process are conducted in sequence.

By contract, our research has found that improvements in the acquisition process, itself, promise much more leverage in meeting future challenges than adjustments in either office charters of reporting relationships.

The third shortcoming, I think, is that there seems to be a lot of faith, perhaps too much, in the applicability of commercial practices to the defense setting.

The dominant theme of many of the recent reform proposals is an attempt to replicate the commercial world. But unfortunately our research has repeatedly revealed that what is sound commercial practice doesn't automatically make sense in a defense context.

Two prominent examples are warranties, which have a mixed record even in commercial applications, and production competition. I'm not referring to design competition. That has been intense for a long time. It does not need further stimulation, and it clearly pays off handsomely.

But in a defense setting, prime contractor price competition in the production phase appears to be characterized in the past by as many failures as successes; and it's very, very uncertain how to choose when to compete.

That's why I think we'd be awfully cautious about an across-the-board implementation of the Competition in Contracting Act. The DOD should be allowed, and in fact, encouraged, to apply that particular act selectively.

The fourth shortcoming of the current set of proposals, and the second to last one, is insufficient attention to the goals of manufacturing efficiency and flexibility. The Packard Commission did urge the use of technology to reduce costs. But this recommendation really focused quite narrowly on the role of prototyping, which in the development phase is a good idea.

But the Commission, and others, seem to accept for the indefinite future what we believe to be obsolescent manufacturing technology that is inefficient except for programs funded at stable production rates close to original program plans, something that we rarely can acheive.

And the final shortcoming is that there seems to be much too much effort toward eliminating uncertainty instead of adapting to it. The current popularity of contractual solutions reflects an underlying but usually unstated supposition, I believe, that defense acquisition can be made to be both stable and predictable.

I don't think it can be done, nor should it really be tried. We have fashioned instead, in some of our RAND work, a prescription for reform that would increase subsystem and system options; improve the Defense Department's ability to identify and hedge against technical and programmatic risks; and strengthen the resiliency of the industrial base to cope with the uncertainty inherent in the defense environment.

The uncertainties are to a large extent unavoidable, I think, but we can do a lot to reduce them, and I think Congress can take the lead in many, many ways, using principally its oversight powers to stimulate adoption of some of the acquisition strategy elements that I have listed.

Working for greater predictability in the funding of acquisition programs, that's something Dr. Ullman mentioned. Accepting the need to provide for contingency funds and so on I think are other important steps.

What may not be so obvious is to slow the pace of legislated changes in acquisition management. In the last 2 or 3 years there has been really thoroughgoing organizational policy and regulatory changes. And we probably need some time now to understand and assimilate the changes, and for the results to be assessed.

That, Mr. Chairman, concludes the remarks that I wish to make, based on the prepared statement, which goes into more depth. And that, of course, is based on reports that we've published and made available to your staff.

I'd be happy to join Dr. Ullman in answering your questions.

[The prepared statement of Dr. Rich follows:]

Statement
of
Michael D. Rich
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Santa Monica, California

Mr. Chairman and members of the Committee, thank you for the opportunity to appear here today. I am Vice President of RAND's National Security Research Division and director of the National Defense Research Institute, the federally funded research and development center sponsored by the Office of the Secretary of Defense at RAND. The views I will express today, however, will be my own; they do not necessarily represent those of The RAND Corporation or any of its research sponsors.

For more than twenty-five years RAND has studied many topics associated with the development and procurement of military systems, including alternative acquisition strategies, the formulation of weapon system requirements, the estimation of technical risks, the estimation of cost and cost growth, the "design-to-cost" approach to cost control, the methods of test and validation, the use of warranties and contractual incentives, the condition of the defense industrial base, the method of budgeting and programming for acquisition, foreign experience in acquiring weapon systems, the effectiveness of multinational development and production programs, and a variety of reliability and maintainability issues.

Our studies have analyzed various civilian systems and almost every type of military weapon and support system except Navy ships (although we have examined numbers of ship-borne systems). Included among the systems studied are aircraft, transports, turbine engines, avionics, missiles, precision guided munitions, spacecraft, armored fighting vehicles, helicopters, nuclear power plants, computers, oil platforms, pioneer process plants, federal demonstration projects, pipelines, and hydroelectric plants. Sponsors for this research have included the three military Services and the Office of the Secretary of Defense; the Atomic Energy Commission; the National Science Foundation; the Departments of Energy, Transportation, and Health and Human Services; and The RAND Corporation itself.

About a year ago we published a brief report that draws together the major findings and lessons of this large body of research.[1] I have brought along copies of that report, plus a bibliography of our publications in this area, for the Committee and its staff.

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[1] Michael Rich and Edmund Dews, with C. L. Batten, Jr., *Improving the Military Acquisition Process: Lessons from RAND Research*, The RAND Corporation, R-3373-AF/RC, February 1986. This report contains references to the numerous publications containing these and other findings. Those references are not repeated here. See also, Michael Rich and Edmund Dews, "Improving Defense Acquisition: A Strategy to Meet the Challenge," *Defense Management Journal*, First Quarter 1987, pp. 24-38.

In my statement today, I would like to outline an approach to reforming the defense acquisition process and describe briefly a prescription for reform based on our research results. In doing so, I will challenge several aspects of conventional wisdom and popular belief and will offer a set of recommendations that go beyond those of the Packard Commission.

AN APPROACH TO REFORMING THE ACQUISITION PROCESS

Avoid Misconceptions About the Past

The news media have been full of accounts of conflicts of interest, cost overruns, spare parts overpricing, and contractor fraud, not to mention equipment that fails to meet performance goals or to function reliably. While many of these reports have been exaggerated or poorly informed, they reflect an underlying truth. Achievement has too often fallen short of what the public, the Congress, and the military users of new equipment have a right to expect from defense acquisition management. This situation is by no means new, however, and in designing and implementing measures for strengthening the acquisition process, we need to see the situation in perspective.

The traditional measures of success for major system acquisitions are cost growth, schedule slippage, performance shortfalls, and fielding times. These measures, given our current ability to quantify them, do not tell the whole story about the effectiveness of defense acquisition, but they do give important insights. Our research shows that government and industry management can claim at least modest improvements over time--a conclusion contrary to the usual assertion that defense acquisition has become progressively less effective. Specifically,

- Cost growth for major Department of Defense programs of the 1970s averaged 5.8 percent per year (over and above inflation); the comparable figure for programs of the previous decade was 7.6 percent. Average annual cost growth for comparable programs in the first half of the 1980s is 4.4 percent (over and above inflation). Defense programs have generally experienced less cost growth than comparable nondefense programs, in some cases much less.

- 1970s programs exhibited somewhat less schedule slippage than those of the 1960s.

- 1970s performance shortfall was close to zero on average, although, as before, some individual programs did experience significant performance problems.

- There has been no lengthening of the heart of the acquisition cycle--from start of development to a point well into the production phase--over the past three decades. The duration of the planning phase increased a bit during the 1960s and there has been a steady growth in the length of the production phase (owing to the growing complexity of our systems and a rise in unit costs not matched by system procurement funding).

I would be remiss if I did not point out that our research has also led us to identify and explore numerous caveats about these generally positive conclusions.

- We are largely unable to separate the causes of lower cost growth, so we do not know the extent to which recent declines are attributable to more realistic early cost estimates, improvements in cost controls and contract arrangements, greater use of contingency margins during the recent periods of budget growth, or other possible explanations.
- Acquisition research has focused mainly on cost growth during development and early production, but the problems of production instability and stretchout, the longer retention of systems in the operational inventory, and the need to upgrade systems to permit them to meet the increasing threat now require serious attention to cost growth during the production phase.
- System performance measures used by managers and reviewers of acquisition programs have tended to emphasize functional performance, such as vehicle speed and range, thereby failing to capture many parameters that contribute to overall mission effectiveness (such as those related to the reliability and maintainability of our systems).

Despite the real instances of very troubled programs, the acquisition process has been much more successful than many critics have claimed. We must resist proposed changes that rest on false premises (such as proposals to compress development and overlap development and production because of the mistaken notion that we have been taking longer and longer to reach the full-rate production phase).

Recognize the Key Challenges of the Future

Despite the Defense Department's past record of achievement, our research has led us to conclude that the acquisition process does indeed require major changes. The reason lies primarily in four important trends:

- **Escalating enemy threats.** The combat capabilities of the Soviet Union and its allies have grown in geographic breadth, numerical size, and qualitative capabilities. For the first time, the Soviets can threaten many critical elements of U.S. support infrastructure. This greatly complicates the technical and operational challenges faced by U.S. weapon developers. Future weapon systems must not only keep pace with the functional performance improvements in enemy weapons, but *in addition* they must be designed to allow substantial improvements in the mobility and supportability of U.S. forces, their productivity in combat, and their resiliency to attacks on their support infrastructure.

- **Resource constraints and uncertainties.** Defense budgets will almost certainly level off or even begin to decline in real terms, thereby increasing the resource pressure on defense acquisition. And trends within the defense budget (such as the funding competition between readiness and modernization programs) may add to that pressure. To overcome the decline in the number of men and women of prime military age, pay scales may need to rise considerably, leading to a shift of budgetary resources from materiel to personnel.
- **Longer retention of weapon systems in the operational inventory and fewer new programs.** With major weapon systems becoming increasingly capable, complex, and costly, progressively fewer new major acquisition programs are being started and, within each program, fewer units are bought each year. One result is that weapon systems are now retained in active service for longer and longer periods of time. All three Services will thus have to deal with aging systems and the associated problems of obsolescence.
- **Increasing difficulties of producing at an affordable cost.** Many programs incur cost growth even after they are years past the beginning of full-scale development. One explanation can be found in the frequent production stretchouts and year-to-year production rate changes that they experience. Because most weapon production employs out-of-date, inflexible manufacturing technology, this production-phase turbulence makes low-cost production and effective cost control exceedingly difficult.

The implications of these trends are clear and they ought to be the guideposts for concentrating efforts at acquisition reform. Specifically, those responsible for weapon acquisition must:

- Strengthen the process by which combat *subsystems* are developed and used to upgrade fielded weapon systems.
- Increase the number of new system "platform" options available for evaluation through the remainder of the century.
- Enable our defense industrial base to produce efficiently at usually low but frequently changing rates of production (the likely environment of the future).

Only by focusing tightly on these critical objectives will acquisition reform efforts achieve the improvements necessary to meet future challenges. Moreover, proposals that do not directly improve our ability to achieve these objectives are of secondary importance.

A STRATEGY FOR ACQUISITION REFORM

To meet the acquisition challenges of the present and future, we recommend an integrated strategy of mutually supporting components. None of the components is novel, although each is currently an exception to general practice, at least in emphasis. Although the strategy has wide applicability across the full range of military weapon systems, it should not be rigidly applied, nor is it a panacea.

This strategy is described in detail elsewhere; let me first list its eight major elements and then briefly describe them:

- **Improve the Requirements Formulation Process**
- **Make the Early Phases of Development More Austere**
- **Develop and Mature Critical Subsystems Separately from Platforms**
- **Encourage Austere Prototyping**
- **Use Phased Acquisition to Improve the Transition from Full-Scale Development to Full-Rate Production**
- **Focus Greater Attention on Upgrades**
- **Encourage Plant Modernization by Means of Computer-Integrated, Flexible Automation**
- **Continuously Evaluate the effects of Acquisition Policy Changes**

Improve the Requirements Formulation Process

There has never been a greater need to structure requirements for new operational capabilities wisely. This requires:

- A more coherent planning framework that first considers the general capabilities needed to underwrite U.S. strategies and commitments and then examines preferred concepts of operations and the specific military capabilities implied by these concepts
- A strong, central, and coordinated focus to exploit and integrate the unique capabilities of each Service, eliminate unnecessary and undesirable duplication, and assure common analytic approaches for dealing with a common threat
- A stronger role for the major operational commanders
- More planning that addresses entire "categories" of equipment (fighter aircraft, helicopters, and attack submarines, for example) rather than individual weapon systems. This would

facilitate the structuring of hearings along mission lines, as suggested in the Committee's 1985 Staff Report on Defense Organization

- More systematic consideration of possible tradeoffs among the various characteristics of the weapon system platform and its associated munitions, support systems, and basing modes.

Make the Early Phases of Development More Austere

Greater austerity during the initial stages of new programs is essential to increasing new program starts, increasing the number of new concepts evaluated in each program, and weeding out unpromising concepts before they attain too much bureaucratic momentum. Detailed, technically oriented guidelines at the beginning of concept validation should be replaced with more general statements of mission and system performance goals, plus details of the expected operational environment and important resource constraints and targets. This change will promote design creativity and reduce both government and contractor management costs.

Develop and Mature Critical Subsystems Separately from Platforms

For the foreseeable future, U.S. forces will modernize principally by upgrading current weapon systems with new subsystems featuring higher levels of functional performance and superior reliability and maintainability. To assure the availability of an adequate menu of mature subsystem options for such upgrades, the Defense Department must fundamentally change the way it develops certain types of equipment, especially combat-related electronics.

Currently, the full-scale development of electronic subsystems is begun well after the full-scale development of the platforms in which they will be incorporated. This is so for both aircraft avionics and the increasingly sophisticated electronic equipment embodied in surface systems. In general, the developer of an electronics subsystem has less than two years to mature his equipment before it must be installed in a pre-production platform. The pace and phasing of subsystem development present difficulties not only for the equipment developer but also for the decisionmaker, because the unavailability or immaturity of critical subsystems and their associated support elements (support equipment, technical orders, etc.) during early testing detracts from the quality of the test information used in evaluating a system's readiness for production.

For sophisticated electronics functions that are critical to the combat performance of our platforms--fire control radars, navigation and ranging, surveillance and target acquisition, electronic countermeasures, and the like--we must provide sufficient development iterations to ensure that the equipment meets the required level of reliability and maintainability. This approach is known as "maturational development." In the strategy we favor, the development of the platform would be decoupled from that of critical electronic subsystems, so as to allow the necessary "head start" in their development.

The required functional performance capabilities of the subsystems can usually be demonstrated within a single development cycle. That level of performance would then be "frozen." In the extra time made available by this approach, the subsystem would be subjected to as many cycles of design, test, and evaluation as might be needed to attain the required level of reliability and to demonstrate the required capability for fault isolation.

Maturational development is a proven concept, having been applied successfully to space and ballistic missile subsystems and to many commercial electronic subsystems. The Carousel inertial navigation system, used in both civil and military aircraft, is an outstanding example. Also, maturational development is essentially the strategy the Air Force has successfully adopted for turbine engines. As they mature, building blocks become available for use in more than one weapon system--new ones as well as those being upgraded. The benefits include not only improved subsystem reliability but also avoidance of duplicative development efforts.

Encourage Austere Prototyping

Use of full-scale demonstration models before beginning formal full-scale development--sometimes known as fly-before-you-buy--has gone in and out of fashion over the past 40 years, although it has been consistently supported by the results of RAND research.

If prototyping is done austerely, as we recommend, its cost need be no more than a very small percentage of total program costs, perhaps 1 to 5 percent. Much evidence suggests that prototyping helps to control cost growth; thus the up-front investment in a prototype may subsequently lead to savings. Even more important than control of cost growth, however, is the boost prototyping gives to system quality through earlier, more detailed, and more reliable identification of serious engineering problems. Finally, prototyping enhances the accuracy of early cost estimates, the understanding of subsystem interface difficulties and requirements, and the overall effectiveness of program management. In short, this approach to early development, especially when coupled with maturational development of critical subsystems, can greatly improve the chances of success in the subsequent full-scale development phase.

Use Phased Acquisition to Improve the Transition from Full-Scale Development to Full-Rate Production

Recent emphasis on independent and realistic operational testing is a major step forward. Testing, however, is not enough. The test results must be exploited before high-rate production begins, and typical schedules usually do not allow enough time to do so.

- High-rate production decisions occur long before the end of testing, usually before the end of development testing and sometimes even before the beginning of operational testing.
- The operational user takes delivery of substantial numbers of units before the completion of testing.
- These patterns exist whether or not early prototyping is part of the development strategy.

By the time testing is concluded, test data fully analyzed, and desirable design changes identified, many units having the original system configuration are typically already in the field. Incorporating changes in these units is expensive. Work in progress at RAND indicates that for a fighter's radar alone, design improvements could cost several hundred million dollars. Faced with such costs, the Services have often decided to accept degraded capabilities.

Failure to exploit test information, if it persists, will negate the benefits expected from more thorough testing and reduce the advantages derived from austere prototyping. The decision to begin high-rate production must not take place so early that it prevents exploitation of lessons learned from operational testing. Nor should the emphasis on operational testing necessarily imply a delay in the start of production activities. What is needed is a longer period of low-rate production, during which corrective design actions can be economically made. This strategy for exploiting test information is called phased acquisition.

Focus Greater Attention on Upgrades

The increasing importance of upgrading fielded systems as the cost-effective way of modernizing U.S. forces requires additional changes in the acquisition process. In particular, the Services need to collect engineering data in realistic operational settings throughout a system's operating life. Because its purpose is to identify both equipment deficiencies and opportunities for upgrading, this type of testing and analysis calls for much more active and direct participation by contractor design engineers than has previously been common in the operational phase.

In fact, the acquisition process should explicitly encourage upgrades in parallel and in competition with new system programs. In many circumstances, this kind of competition promises greater benefits than the usually much more costly method of supporting two prime contractors through full-scale development of a new system. It also increases flexibility in adapting to many of the uncertainties that surround acquisition of defense systems.

Encourage Plant Modernization by Means of Computer-Integrated, Flexible Automation

The U.S. defense industry has established world leadership in the design of weapon systems, but is unable to fully exploit this advantage because support in the form of modern production facilities is often lacking. In general, defense procurement relies on some of the oldest manufacturing plants in the U.S., and the rate of investment in new equipment for defense production appears to be quite low. This handicap is difficult to overcome, however competent contractor and service managers may be, especially when changes in design and production rate are frequent. Failure to modernize production facilities goes a long way to explain the high production costs, long flow times, and limited surge capabilities that characterize much of defense procurement.

The nation needs substantial investment in new computer-based manufacturing equipment that can quickly shift from item to item and produce very small quantities of varying designs with nearly the same efficiency as traditional production lines can produce large quantities of a single item. Rather than economies of scale, use of such equipment results in economies of scope through high utilization rates and distribution of fixed costs among different products.

Modernization of defense manufacturing facilities should therefore be a major element now in any long-term acquisition strategy that aims at reducing fielding times and cutting unit production costs. DoD already has useful initiatives under way--IMIP, TECHMOD, MANTECH, and the like--but they represent only modest efforts with limited goals. Officials must develop new and more effective ways to stimulate investment in the kind of flexible plant that will be increasingly necessary in the future, when it may be even more difficult to assure stable production rates and when we will have to rely more and more on rapid system upgrades to maintain qualitative superiority. Among other steps, the Services should emphasize flexible production capabilities in modernization of depot facilities and in prime and subcontractor source selection at every stage of the acquisition cycle.

Continuously Evaluate the Effects of Acquisition Policy Changes

Finally, if it is to meet the challenges of the future, acquisition strategy cannot be static. While we recommend adoption of the integrated strategy outlined here, we realize that it requires systematic monitoring, assessment, and readjustment. Appropriate metrics and data systems will be necessary. Furthermore, officials must assign responsibility for both day-to-day monitoring and in-depth analysis in order to ensure that senior managers and policy-makers have adequate information to assess the long-term effects of policy changes and to help in formulating new policies.

WHAT'S DISTINCTIVE ABOUT THIS APPROACH

RAND has recommended the strategy outlined above for many years and I am pleased that several elements of this strategy (along with some of our more detailed recommendations) appear in the Packard Commission report and various congressional acquisition reform packages. However, our preferred approach and specific recommendations are distinctive in several important respects. To sketch those differences most starkly, let me mention what I believe to be the five principal weaknesses or limitations of the popular prescriptions for acquisition reform.

- **Insufficient appreciation of the importance of upgrades.** The principal means of modernizing U.S. (and allied) forces to counter future improvements in the enemy threat and deal with the growing problems of obsolescence will not be new system platforms, as in the past. And yet acquisition reformers pay little attention to the problems associated with generating promising subsystem improvement and replacement options and the process by which fielded systems can be upgraded in timely fashion at low cost.

- **Inadequate attention to the underlying acquisition process.** The Packard Commission emphasized organizational and personnel questions, paying relatively little attention to how the necessary steps in the acquisition process are conducted and sequenced. By contrast, RAND's research has found that improvements in the acquisition process, itself, promise much more leverage in meeting future challenges than adjustments in office charters and reporting relationships.

- **Too much faith in the applicability of commercial practices to the defense marketplace.** The dominant theme of many of the recent reform proposals is an attempt to replicate the commercial world. Unfortunately, RAND research has repeatedly revealed that sound commercial practices do not automatically make sense in the defense context. Two prominent examples are warranties, which have a mixed record even in commercial applications, and production competition. Design competition has long been intense, needs no further stimulation, and clearly pays off well. But in the defense setting, prime contractor price competition in the production phase appears to be characterized by as many failures as successes, with much uncertainty about how to choose when to compete. An "across the board" implementation of the Competition in Contracting Act in acquiring new weapon systems will surely fail to achieve the benefits Congress hopes for. The DoD should be allowed and, indeed, encouraged to apply the Act quite selectively.

- **Insufficient attention to the goals of manufacturing efficiency and flexibility.** Although the Packard Commission has urged the use of technology to reduce costs, this recommendation focused narrowly on the role of prototypes in the development phase.

The Commission seemed to accept for the indefinite future an obsolescent manufacturing technology that is inefficient except for programs funded at stable production rates close to original program plans.

- **Too much effort toward "eliminating" uncertainty (instead of "adapting" to it).** The current popularity of "contractual" solutions reflects an underlying but usually unstated supposition that defense acquisition activities can be made to be both stable and predictable. That assumption, of course, is far from reality. Consequently we have fashioned a prescription for acquisition reform that would increase subsystem and system options, improve the Defense Department's ability to identify and hedge against technical and programmatic risks, and strengthen the resiliency of the defense industrial base in coping with the uncertainty inherent in the defense environment.

Although the uncertainties faced by defense acquisition are to a large extent unavoidable, much can be done to reduce these uncertainties and successfully adapt to them *if the existence of risk and uncertainty is more fully accepted and reflected in acquisition decisions.* In this--let me say in conclusion--the Congress can take the lead in important ways. Using its oversight powers to stimulate adoption of the acquisition strategy elements described above is the foremost example. Working for greater predictability in the funding of acquisition programs, and accepting the need to provide R&D contingency funds, are also important steps. What may not be so obvious is the need to slow the pace of *legislated* changes in acquisition management. In the last two or three years thoroughgoing organizational, policy, and regulatory changes have been initiated. Time is needed for these changes to be understood, assimilated, and carried into effect, and for the results to be assessed. Once a more rational strategy becomes the norm, the acquisition process will surely benefit if its managers are allowed a respite in which to get on with the job.

Senator BINGAMAN. Well, thank you both very much.

Let me just start and ask each of you if you have had an opportunity to brief the Office of the Under Secretary of Defense for Acquisition on the recommendations that you've come up with in these two reports.

Dr. Ullman, have you had that chance or not?

Dr. ULLMAN. I have briefed some of the staff members. We have requested briefings with the Under Secretary and his principal deputies, which we assume will take place in the next month or two.

Senator BINGAMAN. Dr. Rich, have you briefed the Under Secretary?

Dr. RICH. No, my answer is very similar. We have briefed Deputy Secretary Taft on these recommendations, and Dr. Hicks, who was the Under Secretary for Research and Engineering, as well as Dr. Wade.

But we have not briefed either of the last two gentlemen's successors. We have, however, briefed Dr. Latham, Dr. Fredericksen and Admiral Small, three principal officials in the current Office of the Under Secretary.

But neither Mr. Godwin nor Dr. Costello have heard these recommendations.

Senator BINGAMAN. Dr. Rich, you said as I understood you, that there's been no lengthening of the heart of the acquisition process; is that the phrase you used?

Dr. RICH. That's right. I was referring to the period of time that begins with advanced development, essentially Milestone One, on out to the delivery of the first operational unit.

There has been no growth in that period over the past 30 years. We have actually examined each of the important segments of subsets of that interval, overall interval, and some of those have actually gotten shorter.

What was increased markedly is production time. It takes longer to produce a given number of units today. But that's largely a reflection of the increasing capability, complexity, and real cost of our systems.

We're putting about as many dollars, for example, into fixed wing aircraft procurements today as we always have, but each dollar buys a smaller fraction of an end item than it used to, because we've chosen to embed more capability in individual items than we have in the past.

And that, of course, is a result of the requirements formulation process.

We've also looked at that part of the overall acquisition process that comes before what used to be called DSARC–I, the very early milestone or phase zero portion. We don't see even a lot of growth there, although it's very difficult to measure that phase.

We have been able to detect a 1 or 2 year growth in that phase, but it occurred, interestingly enough, in the 1960s, not the 1970s when most people allege it to have occurred, and we also find a number of exceptions in every era, long programs in the 1950s as well as the 1970s, and very rapid programs in the 1950s as well as the 1970s.

On balance, Senator, let me say that the evidence is just too limited to conclude unambiguously that there's been a steady lengthening of fielding times.

Senator BINGAMAN. Now, am I right that the Packard Commission concluded the opposite?

Dr. RICH. Implicitly they did. And there have been other studies that have concluded the opposite, the most notable of which was the Defense Science Board study in 1977, I believe, chaired by Richard DeLauer, which did conclude that acquisition time was extending.

We've been unable to duplicate that result.

Senator BINGAMAN. Nothing you're saying here contradicts or is intended to contradict Mr. Gross' comments about the time from the issuance of an RFP to the actual production?

I gather he was talking about a period prior to this acquisition process as you're defining it? Or maybe you did want to contradict it?

Dr. RICH. Well, let me comment. I respect the comments of Mr. Gross. This is the first time I had heard those from him, although I have heard similar comments from others.

One thing I can say is that we have not yet seen the effects of those types of observations on measurable program events from the standpoint of the major system acquisition manager.

We have not seen slippage in onset of construction activities. We have not seen slippage in onset of activities like testing programs or first flight.

Much of that delay that is being spoken of is apparently being absorbed within a program without the consequential effects on the delivery schedules of the end items.

But it's worthy, I think, of some additional exploration, because the anecdotes of that sort are numerous. But we've really been unable to see a systematic lengthening of these overall trends over about a 30-year period.

Senator BINGAMAN. Dr. Ullman, did you have any conclusions on the length of the acquisition process that you wanted to elaborate on?

Dr. ULLMAN. Yes, Senator. Dr. Rich and I would disagree on the margins. It's really a question of, from whose perspective?

I am sure there is sufficient analysis from a given perspective, given that milestones over time have changed, and been in different parts of the process.

I would just say that there are two points that are very important. From the industrial perspective, there is the perception that procedures are lengthening, which is going to make things more expensive.

Second, especially in software and computers and other subsystems, brand new generations that develop almost overnight, the longer the delays the more obsolete or further behind new equipment is likely to be.

Now, there are some reasons why you may want to stretch things out. But somehow the modernization point has got to be taken more centrally in how we buy our systems.

There is one point I would like to agree strongly with with Dr. Rich.

It seems to me that's he on a very, very strong point here, and I would look at this more as an issue of strategy than narrow acquisition.

In 1965, we had a 50 percent larger active duty force, and in real terms, spent 50 percent less money to maintain them. In 22 years, the cost of maintaining our active duty force structure in real terms have doubled.

What this means is that we are simply not going to be able to buy more and more platforms into the future.

The services have gotten into the position where they are almost all platform-dependent, whether it is tanks, airplanes, or ships. And the services have gotten this marvellous new notion of the offense. It almost sounds like France in 1903. Everybody is going to go out and attack the other side.

What that means is there are going to be increasingly more expensive platforms, to get more capability, to take on an increase in threat. And subplatforms, the weapons and the sensors, I think, are going to be left behind.

It is interesting to note that there's no assistant secretary for weapons in any of the particular services or OSD.

So I would reaffirm Dr. Rich's observation that subsystems, electronics and weapons, can be a good leverage point. And I think in terms of the overall strategy, we need to look much more closely at those subsystems while our basic platforms last longer.

Senator BINGAMAN. Given the assumption, if it's accurate, that we have an acquisition process that takes as long now as it did 30 years ago. Is that a significant problem in light of the increasing rate with which items are developed in the commercial sector?

It strikes me—I think some of the testimony we have received indicates that in the commercial sector new products are coming on the market, becoming obsolete and being replaced in a 2 or 3 year cycle now in many areas.

And in the defense sector we're still in 10 to 12 years or something in that range, to get something into full scale development or get it to deployment, full scale production.

Is it enough to say we're doing as well as we did 30 years ago in getting these items through the acquisition process?

Dr. RICH. Well, I think that's a very, very good question. The answer of course is, from my standpoint, that simply because there's no growth does not mean that we can't streamline and shorten.

And of course I wouldn't oppose attempts to do that. I was just cautioning that many of the proposals to compress time and overlap development and production stem from a premise, it seems to me, that we are taking longer and longer, and I think we have to be cautious there.

I also am very cautions about making the next leap from an observation that the commercial world is operating differently than the defense setting. Because we don't have in the defense community a good track record of applying commercial practices, business practices, in the defense setting.

There are just many, many differences in the job that has to be done from a defense standpoint.

Warranties and other contractual incentives are very good examples. So while I would take note of the commercial experience, I would be cautious about the implications that someone would draw from better commercial practices.

Dr. ULLMAN. I think that two of the things that have changed, Senator, the first is that the atmosphere of the defense environment has changed, I think for the worst.

Section, because of that in large measure, the sharing of risks and high technology between Government and industry has also decreased.

So the Department of Defense is in many ways in a vicious circle. Because the longer things are stretched out, the newer technologies can become available and make these things obsolete.

Replacement requires change orders. Change orders require more money. More money is going to get increased public scrutiny, and who knows whether the new systems will work or not.

So largely because of the acquisition environment, we've been put in a situation where the press of technology and the environment are going in opposite directions, and somehow that environment has got to be improved so that there can be greater sharing of technical risks when it makes sense to do so.

And so that as we have these development times, we can incorporate technology in a sensible manner.

Senator BINGAMAN. Let me just ask about one other subject, and then I'll let you go.

MODERNIZATION OF DEFENSE MANUFACTURING FACILITIES

Dr. Rich, you said in your statement that modernization of defense manufacturing facilities should be a major element now and in any long term acquisition that aims to reduce fielding times and cut unit production costs.

Then you indicate that MANTECH and TECHMOD in similar programs are a modest effort, which I agree with. But you then say, officials must develop new and more effective ways to stimulate investment in the kind of flexible plant that will be increasingly necessary in the future, when it may be even more difficult to assure stable production rates, and we will have to reply more and more on rapid system upgrades.

Do you have any ideas on how we're to do that? I like your suggestions. I like your idea, but the information I have is that we see the administration backing off these modest initiatives that you refer to, and yet there seems to be a crying need for new ideas and initiatives to begin to modernize and upgrade our manufacturing capability.

If you have any ideas as to what we should do other than just continue to support these modest efforts, I would be anxious to hear them, very seriously.

Dr. RICH. Well, I regret that I don't have any magic suggestions, because this is a case where it requires resources and the commitment of resources.

There may be alternative organizational forms of applying these recources. Government owned equipment but contractor operated plants that have not been investigated, as far as the establishment of new arrangements in recent years; some sort of a matching fund incentive program.

These are things that our researchers have identified as hypotheses or possibilities. We have not performed any research on them.

But I share your concern that the administration does not seem to be—or the current Pentagon management does not seem to be—increasing the emphasis quite as quickly as perhaps the merits of the ideas might warrant.

And I would share your recommendations or suggestions that they get on with that.

Dr. ULLMAN. Senator may I respond to that, please?

Senator BINGAMAN. Certainly.

Dr. ULLMAN. Conceptually, I think the notion of flexible manufacuturing is extraordinarily innovative, and it has tremendous appeal.

We didn't analyze it, but we got into this in some depth. In what I would categorize at best as discussions. The manufacturing studies board of the National Science Foundation has looked at this to some degree.

The NSF are genuinely and generally skeptical. But it seems to me that this idea has so much potential than an organization like that ought to be tasked to make a detailed study to see where and how this could be implemented.

Because if it can be, and I have some doubts, but I think it needs to be looked at, Dr. Rich's suggestion of working on the supply side or the user side to take care of this uncertainty has tremendous appeal.

Now, I'm doubtful. But I think it is a very novel idea, and I think some research ought to be done to come up with some specific recommendations.

Dr. RICH. If I could just expand very briefly on the point that Dr. Ullman referred to.

The mismatch that many people have identified between the buyer and the seller in the defense marketplace stems from the fact that the buyer is very volatile and unstable and unpredictable. The threat changes, and the production rate chantes, and so on.

The supplier, on the other hand, is very rigid. Everytime the production rate or production plan changes, price changes, and usually in the upward direction.

That's a mismatch that's been recognized for some time. But all the focus in the past has been on the buyer's side, through multiyear authorizations, multi-year appropriations, multi-year contracting, and so on.

We've heard about these for a decade or longer. What hasn't been done is focus attention on the supplier; in other words, accept the unpredictability or volatility of the demand side, and focus on improving or increasing the resillency of the supplier.

I don't think that was even possible many years ago. I think the introduction of some of these flexible manufacturing techniques do hold the promise now of being able to address that mismatch from the seller's perspective.

And we ought to increase the emphasis in that area. And so I would agree with Dr. Ullman on that.

Senator **Bingaman**. Let me thank you both very much for excellent testimony and excellent reports. We will try to move forward and act on some of these recommendations.

[Questions for the hearing record with answers supplied, follow:]

QUESTIONS SUBMITTED BY SENATOR PHIL GRAMM

DOD REQUESTS FOR DATA

Senator **Gramm**. Mr. Trimble, in all your statements you make reference to the increased Defense Department requests for data and the amount of DOD oversight activities in your plants. Do you have any estimates of the cost of responding to these requests?

Mr. **Trimble**. We estimate these costs to be approximately $16 million annually at one of our operating locations where last year's sales totaled $1.6 billion. However that amount is not verifiable because we do not accumulate these costs in a separate account.

Senator **Gramm**. Who pays for supplying this information? Does it come from contractor profits or is it passed on to the taxpayer in increased overhead?

Mr. **Trimble**. These costs are charged to overhead and result in higher prices paid by the taxpayer.

DUPLICATIVE AND EXCESSIVE AUDITS

Senator **Gramm**. In responding to contractor criticisms of duplicative and excessive audits, the Department of Defense claims that audits are only a small percentage of the reviews conducted at contractor facilities and that audits are carefully coordinated. How do you distinguish the proper types and levels of DOD audit and oversight activities from those that are not?

Mr. **Trimble**. These activities are proper as long as they fulfill a valid need to protect the government's interests. However, we believe the following activities are unnecessary:

More than one activity or government office review or audit to accomplish the same purpose.

More than one audt or review of the same subject.

The DOD Inspector General found both of these situations in a review of one of our major operating locations. (DOD Inspector General Report No. APO 86-011 dated December 20, 1985)

Senator **Gramm**. What is the essential problem in this area?

Mr. **Trimble**. There is an apparent lack of coordination between the government offices involved in acquisition, contract administration, and the Defense Contract Audit Agency.

DOD PROFIT AND FINANCE POLICIES

Senator **Gramm**. You have all expressed grave concerns about the long-term impact of DOD profit and finance policies on the level of contractor innovation and on the health of the defense industrial base. How should profit and finance policies be structured to incentivize contractor productivity and innovation in the long-term?

Mr. **Trimble**. We have several recommendations, all dealing with the amount of money available to industry to fund investments for productivity and innovation:

DOD's Interim Rule should be revised to eliminate the 1% reduction built into the profit formula. Lower profit potential discrourages all but the absolute minimum investments required to stay in business. The result is a less efficient industry. In addition to this general recommendation, we recommend the reinstatment of the following incentives that were eliminated from the DOD profit policy by the Interim Rule:

"Productivity"—a "special factor" in the previous profit policy was designed to encourage cost reduction. The "Productivity" incentive was the only way a contractor could reduce cost and *not* be penalized by lower profit markup on the next contract. According to DOD, it was eliminated because it was infrequently reported in their internal reporting system. We believe this is more of a problem with reporting than with the concept.

"Independent Development"—a "special factor" in the previous profit policy encouraged contractor private investment in the development of items subsequently purchased by the government. As with the "Productivity" incentive, it was eliminated by DOD because it was infrequently reported. The concept was good and to eliminate it discourages contractor innovation.

Progress payment rates should be increased and the requirement for contractor funding of special tooling and special test equipment should be eliminated. These actions would have two desirable results:

Contractor investment in productive plant and equipment and research and development would increase if funding could be diverted to these investments by reducing inventory and special tooling investments. This would make the industry more efficient and competitive.

The costs to the government would decrease because the Treasury can borrow money at a lower interest rate than industry. The decrease in DOD contract prices would more than offset the increase in interest cost paid by the Treasury.

CONTRACTOR PRODUCTIVITY INVESTMENT REQUIREMENTS

Senator GRAMM. Won't increases in contractor productivity investment requirements result in a shrinking industrial base over the next few years of constrained defense budgets?

Mr. TRIMBLE. Decreases in contractor productivity investment will result from the combination of lower profit markup, greater contractor investment in inventory and special tooling, and the constrained defense budgets. This will result in a smaller and less efficient defense industrial base.

SINGLE, SIMPLIFIED PROCUREMENT STATUTE

Senator GRAMM. Gentlemen, the Packard Commission placed great emphasis on the importance of a single, simplified procurement statute. How important are unified statutes and policies to your business?

Mr. TRIMBLE. We interpret the Packard Commission recommendation for a single, simplified procurement statute to mean one statute that sets forth in broad terms how the Federal procurement process will be performed. It is intended to simplify policy direction primarily by a major reduction of the very large number of statutes that now apply to Federal procurement. If The Congress would take this step, it would constitute an invaluable improvement in the efficiency of the process.

By like token, if the writing of executive branch policies and procedures were consolidated into one activity; and if agency/departmental supplements to cover peculiar situations and requirements were restricted by a central policy office, similar economies would be possible.

As a large corporation, we are able to keep abreast of the large volume of rules and regulations better than small to medium firms are able to achieve. However, we experience considerable difficulty with the statutory/regulatory system:

The complexity and the diversity of rules and management systems are so great that under the new criminalized aspect of procurement, we do not know from one day to the next whether we may be in violation of a rule or interpretation of a procedure followed for many years. Unfortunately, these violations may be presented in the media as fraudulent actions.

There are many rulemakers: 29 congressional committees and 55 subcommittees have budgetary or oversight involvement in some aspect of the defense acquisition process; many separate buying organizations write their own interpretations of rules. Compliance with the rules can be difficult and costly.

CHANGES IN POLICY, REGULATION, AND LAW

Senator GRAMM. Mr. Trimble, on pages 2 and 3 of your statement you mention a list of recent changes in policy, regulation, and the law which you feel are having an adverse impact on the defense industry. Could you pick the ones that are having the most serious consquences and discuss the impacts?

Mr. TRIMBLE. As previously discussed, the reduction in progress payments and the requirement for contractors to finance part or all of the cost of special tooling without adequate assurance of indemnification in the event of program cancellation are serious problems. These policies benefit neither the government nor industry.

Another serious problem is the practice of cost sharing on development efforts. These are very high risk investments in the fiercely competitive environment of dual sourcing and the uncertainty that the program will be approved for production. The result will be less competition at the development stage of the program. Cost sharing should be stopped.

PERIODIC PROFIT STUDIES

Senator **Gramm**. Mr. Trimble, there has been considerable discussion this year about legislation to require periodic profit studies. Does AIA haver any suggestion regarding such legislation regarding an alternative legislative approach?

Mr. **Trimble**. AIA would not be opposed to a profit reporting system run by the DOD under the following conditions:

The contractor data provided would not include data on commercial sales.

The statute would include a provision precluding release under the Freedom of Information Act or Congressional subpoena.

The data would be provided to a private sector firm employed by the DOD and would not be subject to DCAA or GAO audit.

The data would be subject to audit by the contractor's independent CPA firm.

Only aggregated data, not identifiable to a company, would be released by the private sector firm to the DOD.

DOD REQUESTS FOR DATA

Senator **Gramm**. Mr. Williams, in all your statements you make reference to the increased Defense Department requests for data and the amount of DOD oversight activities in your plants. Do you have any estimates of the cost of responding to these requests?

Mr. **Williams**. No BDM does not have specific cost estimates for DOD audit and oversight activities which take place at its facilities. The Company, however, is cooperating in a current effort by DOD towards that end. The Council of Defense and Space Industry Associations (CODSIA) has been requested by DOD to coordinate the compilation of industry data concerning the nature and frequency of reviews performed by government agencies or high-tier contractors which directly or indirectly relate to the performance of government contracts or subcontracts. The Electronics Industry Association, a member of CODSIA, has asked BDM to provide information on these reviews covering a six-month period. I understand that CODSIA plans to submit the data to DOD toward the end of the year.

Senator **Gramm**. Who pays for supplying this information? Does it come from contractor profits or is it passed on to the taxpayer in increased overhead?

Mr. **Williams**. Supplying information for these increasing audits and reviews results in a cost to the company and, as with other recoverable costs, these additional expenses are charged to overhead with a consequent increased cost to the government, as well as the company.

DUPLICATIVE AND EXCESSIVE AUDITS

Senator **Gramm**. In responding to contractor ciriticisms of duplicative and excessive audits, the Department of Defense claims that audits are only a small percentage of the reviews conducted at contractor facilities and that audits are carefully coordinated. How do you distinguish the proper types and levels of DOD audit and oversight activities from those that are not?

Mr. **Williams**. I would say that the proper types and levels of DOD audit and oversight are those minimums which are required to assure DOD that its programs are being performed and administered in a correct, economic, and efficient manner. Information should be requested only one time. The difficulty is that each DOD audit or oversight activity claims a special purpose, peculiar perspective, or legal or regulatory provision as the reason why it cannot use the material, audit, report, or whatever may be involved, developed by another DOD component. Let me give you an example of what happens, and you judge for yourself.

The Baltimore Defense Contracts Administration Services Management Area conducted the annual BDM property control system survey during the week of March 16, 1987. A total of 31 contracts were candidates for sampling by the survey team. The result of the survey was a satisfactory rating with no deficiencies. On April 30, 1987, however, we received a letter from the Baltimore DCAS which advised of another pending audit of the property control system of "Other Plant Equipment" by a six-member DOD Inspector General team. Of the thirteen contracts selected for this audit, nine were included in the March audit. I should point out the "Other Plant Equipment" is the preponderant property category and was intensely involved in the March survey. The DOD IG review is examining these thirteen specific contracts in great detail, but these were included in the March review. Seventy percent of the contracts selected by the DOD IG for review represent a duplication of activity within a six-month period. The review team will be composed of six members who will devote two weeks to the review. The DOD IG review is just one current example of where the same data, or slightly different data, is examined by different DOD components for supposedly somewhat different purposes.

Senator **Gramm**. What is the essential problem in this area?

Mr. **Williams**. The essential problem with respect to duplicative and excessive audits is that there is no overall control of the process. Each functional activity performs audits and requests information in accordance with its own agenda and requirements. In addition, when a request is made, the agency does not determine the likely cost to the contractor to gather the information and assist in the conduct of the audit. In many cases, the objectives of the audit could be achieved without the inclusion of information which is particularly costly for the contractor to gather.

DOD PROFIT AND FINANCE POLICIES

Senator **Gramm**. You have all expressed grave concerns about the long-term impact of DOD profit and finance policies on the levels of contractor innovation and on the health of the defense industrial base. How should profit and finance policies be structured to incentivize contractor productivity and innovation in the long-term?

Mr. **Williams**. As we approach this very important question, it's critical that we recognize the situation as it currently exists. Simple economics indicate that the current supply of quality professional services to meet continuing requirements of the defense sector is generally equilibrium due to the current economics at play in the marketplace. By that I mean supply roughly equals demand.

If current profits were unjustifiably high we would see continuing increases in alternative sources of supply, and as a result, the continuing demise of companies unable to survive in an environment of excess supply. In reality, what we see today is the healthy growth of those companies which are able to consistently deliver quality services and thereby satisfy their clients' needs. We see the gradual entry of new firms established with the belief that they can provide special expertise and/or can provide higher quality services than their competitors. We also see the failure of those companies that are unable to consistently provide the quality services needed to meet the government's critical requirements.

Fair competition among suppliers of reasonably high quality services assures that the government can obtain quality by exercising its prerogative of choice among the available alternatives, including those of various levels at acceptable quality.

The new profit policy results in a substantial change in the existing economics at work. If implemented in its current form, the new policy will result in a 25% to 40% reduction in gross profit on DOD contracts. I believe it is certain that the magnitude of such a change will substantially alter the current economics which have led to development of the professional services industry currently in place and capable of meeting DOD's needs. Again, basic economics supports the conclusion that the best companies with the most competent management and most critical professional talent look to other markets. Supply will decrease and more importantly, the best firms will be the first to put their attention elsewhere.

As a result, I'm suggesting that the government proceed with great care if it believes that the prior profit policy, based on the weighted guidelines, which created the current economic equilibrium, must be changed. I have seen no studies, data, hard facts, or even thoughful opinion which substantiate the notion that the government knows the effects of drastically altering the economics at play in this marketplace.

You've asked how I would suggest the economics should be adjusted. I want to see more emphasis on quality. If I were procuring services, I would provide a base fee simply to reimburse every contractor for legitimate but unallowable costs of doing business—say, 3% based on current interest rates. In addition, I would provide wide discretion for profit over and above the base, dependent on quality. If the contractor did a poor job, zero additional profit, but if he did a truly outstanding job, 12% to 15% should be awarded.

People will argue that award fee approaches are time and resource consuming and thus are not cost-effective for small services contracts. Streamline them. If a junior officer is appointed the COTR to oversee a contract and vested with the responsibility to accept a contractor's product on a $100,000 four-month effort, he should have the prerogative to unilaterally award the profit based on this view of the quality of the product/services delivered.

As regards financing, it simply irks me that the government can't process and pay its bills within 30 days like the rest of the world and yet won't recognize interest as a legitimate business expense. The clock on the prompt payment provision should start when the initial government processor receives a valid invoice rather than when the last one finally get it.

CONTRACTOR PRODUCTIVITY INVESTMENT REQUIREMENTS

Senator GRAMM. Won't increases in contractor productivity investment requirements result in a shrinking industrial base over the net few years of constrained defense budgets?

Mr. WILLIAMS. This may happen to some degree, but I believe the important fact is that whatever the size of the industrial base may turn out to be, its size must be fully capable of satisfying the requirements of the defense establishment. A significant effect of increased productivity investment is that it will improve the capability of the defense industrial base to expand rapidly in times of national emergency. Another important aspect of increased productivity is that this would help reduce the costs of weapons systems.

SINGLE, SIMPLIFIED PROCUREMENT STATUTE

Senator GRAMM. Gentlemen, the Packard Commission placed great emphasis on the importance of a single, simplified procurement statute. How important are unified statutes and policies to your businesses?

Mr. WILLIAMS. The current legislative and regulatory requirements have made the procurement process cumbersome and complex, unnecessarily time consuming, and costly. The procurement process today is understood only by a handful of trained procurement and contract specialists which a company must have if it is to do business with the government. The complexity of the process results not only in additional staff costs but in many unnecessary hidden costs. If a simplified procurement statute would bring about economies by contractors and dollar savings to the government, it should be implemented.

The small, entrepreneurially oriented businesses, which are often the source of many imaginative and innovative ideas, often find the existing defense procurement, system overbearing and fearsome with the result that they turn their energies and brainpower to other sectors of the economy. Similarly, commercial companies are reluctant to enter the defense field because of all the special requirements which do not exist on the commercial side. The net effect is to keep these two resources from becoming a part of the defense industrial base.

DOD PROFIT POLICY

Senator GRAMM. Mr. Williams, you argue that the new DOD profit policy treats the professional services industry unfairly. How do you answer those who claim that, because of lower risk and less of a need for professional services companies to finance large capital expenditures, the new rules are necessary corrective to the unreasonably high profits received by the professional services industry in the past?

Mr. WILLIAMS. Senator, I cannot accept the statement that the professional services industry has received unreasonably high profits in the past. The facts do not support the statement. The profitability of R&D and professional services companies in the defense industry are significantly lower than the manufacturing firms. The studies conducted by the Professional Services Council, our industry's trade association, show that our profit on defense contracts range between 8 to 9% in comparison to about 13% for manufacturing companies. As I pointed out in response to Question 5, if the profits available within the defense sector were unduly high, service companies in the commercial sector would naturally stampede to the defense market.

BDM is considered to be one of the better managed and more profitable companies in our business. In 1986, we earned a net return on sales of 4.2% and a return on equity of 17.92%. I would hardly consider these figures to be indicative of unreasonably high profits.

I have never been able to understand why some believe that professional services contracts present a lower risk to the contractor. This may be so for base support service activities, but it is not valid for R&D and high-tech professional services contracts. There is considerable risk in a contract that calls for the delivery by a certain date of a complex software program for missile guidance or the architecture of a communications system that will assure effective communications between the theatre commander and the battalion commander during combat operations.

There is also a more intangible risk which one might call "reputational risk." A good deal of the business developed by a professional services firm derives from the way it is viewed by its client as delivering a high quality product, the timeliness of delivery, cost consciousness, responsiveness to client needs and concerns, and many other similar considerations. A negative image and a so-so reputation in the market place as a result of poor contract performance does not bode well for that company's future.

Finally, I would also note that the traditional measures of return fail to recognize the basic differences in the types of assets required for the performance of services contracts in comparison to manufacturing. Manufacturers require heavy investment in complex tools, devices, and physical plant. A professional services company relies on people as its assets. These human assets provide the imagination, the initiatives, and problem solving abilities that bring about technological breakthroughs which enable this Nation to maintain its lead in weapons technology and other defense systems. To view profit in terms of a return on physical assets and does not consider this intangible and valuable human asset is a grievous mistake.

DOD OVERSIGHT ACTIVITIES

Senator **Gramm**. In all of your statements you make reference to the increased Defense Department requests for data and the amount of DOD oversight activities in your plants. Do you have any estimates of the cost of responding to these requests?

Mr. **Gross**. DOD requests for administrative and financial data are difficult to measure. The real cost of complying with audit reviews includes not only the salaries and benefits and overhead costs of supporting employees hired to perform that responsibility, but the productivity lost by other employees who are pulled away from their jobs to compile information. We do not have a dollar measure.

I do know that in the past two years my company has added 1.5 senior employees to be responsible for complying with cost/price audits. We have diverted two additional full time people in accounting to pull together the detailed data need for audit compliance. We've spent approximately one man year making our accounting systems more complex so that we can respond to audit questions.

In addition, I estimate that 5% of management time is diverted to various audits. This time and expense has been incurred during a time when total overhead employees have been cut by 15% in order to reduce costs.

WHO PAYS COSTS?

Senator **Gramm**. Who pays for supplying this information? Does it come from contractor profits or is it passed on to the taxpayer in increased overhead?

Mr. **Gross**. All of these costs are overhead and are eventually passed on to government and commercial customers in the price of the product. As a rule, a contractor or subcontractor can only recover the costs as overhead under a firm fixed price contract, which all of mine are. As the cost of complying with audits increases, it increases estimated overhead rates on the next contract, or diverts resources from more productive uses.

AUDIT REVIEWS

Senator **Gramm**. In responding to contractor criticisms of duplicative and excessive audits, the Department of Defense claims that audits are only a small percentage of the reviews conducted at contractor facilities and that audits are carefully coordinated. How do you distinguish the proper types and levels of DOD audit and oversight activities from those that are not?

Mr. **Gross**. PIA members are seeing an increase in all types of oversight activities. I will confine my answer to the audit question. As I said earlier, in three years the number of audits my company undergoes by prime contractors, DCAA and the government buying agencies has increased from 2.5 to 60 per year. For instance, my government contract administrator reports that he has had to review the same indirect costs data with more than three different DCAA auditors over a period of six months. Other contractors and subcontractors are reporting similar experiences.

We would recommend that no program be audited more than once by either DCAA, the prime contractor or other audit activity. Raising the audit threshold would help. Standard rates (overhead, G&A, wage rates, etc.) should be audited no more than yearly by one agency. Contractors whose records are good should not be audited as frequently as contractors whose past audits are not as favorable.

PROBLEMS IN AUDITING AREA

Senator **Gramm**. What is the essential problem in this area?

Mr. GROSS. There are several key problem areas that are susceptible to solution. Assigning an auditor to a particular business would provide continuity and help to prevent multiple reviews of the same data. Upgrading the training and educational opportunities for government auditors could lead to more reliance on their findings and prevent what appears to be "checking on the checkers". In sum, the auditors appear to be driven to find fault. I believe this attitude is a manifestation of the poor relationship between DOD and industry and that this attitude is the essential problem.

DOD PROFIT AND FINANCE POLICIES

Senator GRAMM. You have all expressed grave concerns about the long-term impact of DOD profit and finance policies on the level of contractor innovation and on the health of the defense industrial base. How should profit and finance policies be structured to incentivize contractor productivity and innovation in the long-term?

Mr. GROSS. Both contractor and subcontractor productivity improvements and innovation can be incentivized if contractors and subcontractors have the prospect of an adequate return on their investment over time. The best way to accomplish this goal is for the government "to buy smarter". Profits and price should not be based on "cost", but on value. The government must choose where it spends its money more carefully instead of attempting to shift the cost burden to industry on each contract.

CONTRACTOR PRODUCTIVITY INCREASES

Senator GRAMM. Won't increases in contractor productivity investment requirements result in a shrinking industrial base over the next few years of constrained defense budgets?

Mr. GROSS. Efforts to require more "upfront" investment in productivity are very likely to result in a shrinking industrial base. As government increases unallowable costs, reduces profit objectives, and insists on being able to take advantage of productivity improvements immediately, the additional financial burden and risk may be too much for a number of contractors and subcontractors to support in the face of decreasing sales volume. Others will divert funds from innovation for defense to support investment in plant and equipment.

UNIFIED STATUTES AND POLICIES

Senator GRAMM. Gentlemen, the Packard Commission placed great emphasis on the importance of a single, simplified procurement statute. How important are unified statutes and policies to your business?

Mr. GROSS. Uniform procurement policies to the extent that they are practicable, are extremely important to members of the Proprietary Industries Association. The FAR, DFAR, the agency supplements to the supplements and agency directives to implement the supplements to the supplement constitute a maze that even experienced contracting officers and businessmen have trouble assimilating. Keeping up with these documents is not only time consuming, it is expensive.

In addition to the complexity created by the varying rules and requirements, the layers of procurement rules increase the probability that policy, as determined by Congress, cannot be implemented.

BASIS FOR PRICING

Senator GRAMM. You advocate greater emphasis on having DOD use product value as a basis for pricing. Does DOD do this now?

Mr. GROSS. It does not appear that they do. In the last 3 years, I have not found anyone, at any level within DOD who thinks they are allowed to base price on anything but cost plus profit. The primary concern of the buying agencies appears to be achieving the lowest unit cost for any particular item.

CRITERIA USED IN MEASURING VALUE

Senator GRAMM. What criteria can be used to measure value in a consistent manner?

Mr. GROSS. There are well established formal and informal procedures for determining the value of products that are used by government and by industry. The discipline of assigning numerical values to product attributes is at least partially covered by the academic field of engineering economics. In practice, people experienced in systems design, engineering changes and value engineering assign hard numbers to the value of products every day.

Ultimately determining value is a judgmental process. It is an engineering judgment, not an accounting question.

PROPRIETARY INDUSTRIES ASSOCIATION

Senator **Gramm**. You mention that the Proprietary Industries Association is seeking a balance between the need to encourage innovation and the need to maintain competition. How do you propose that DOD strike this balance?

Mr. **Gross**. As I mentioned in my testimony, innovation is an expensive process. Subcontractors who base their business on providing a "better widget" at their own expense have invested in innovation because they had a reasonable expectation of a positive return over time. Expectation of future sales of a "better widget" is an estimate based on offering better value.

Competition, as it is currently viewed within the Department of Defense, means having two or more bidders offering the identical item.

Better balance could be achieved if competition for items, components and processes developed at private expense was confined to form, fit and function competition unless the government could demonstrate a significant need for a second source of an identical item.

We don't believe this balance, or determination of significant need, can be achieved by lawyers and accountants, or contracting officers or buyers. Guidelines for weighing government need against the value of future innovation should be developed by people who understand the innovative process.

To find a balance between the two, as in the case of value pricing, will require judgment. The proposed final regulations on rights in technical data published by the DAR Council on April 16, 1987, provide some protection for private expense development, but have defined private expense in such a way that private expense development for defense systems could be very difficult to prove.

To illustrate ways in which PIA believes better balance could be achieved and give privately funded innovation a fair chance to compete, I've attached suggested changes in the new regulations on rights in technical data that will become effective on May 18, 1987.

[Additional material supplied for the hearing record from the Proprietary Industries Association.]

Proprietary Industries Association,
Glendale, CA, May 7, 1987.

Hon. Jeff Bingaman,
Hon. Phil Gramm,
Subcommittee on Defense Industry and Technology, Senate Armed Services Committee, Russell Senate Office Building, Washington, DC.

Dear Mr. Chairman and Senator Gramm: The Proprietary Industries Association appreciated the opportunity to present our views to your subcommittee on April 9 and we are pleased to enclose our response to the subcommittee's written questions.

As you know, since April 9, the Defense Acquisition Regulatory Council has issued "proposed final regulations" on rights in technical data. This policy is of special concern to PIA and we ask that our concerns, and recommendation for improving the regulation be included in the Record, along with this letter.

With best wishes,

Paul J. Gross,
President.

Enclosure.

The following articulates the major concerns of the Proprietary Industries Association with respect to the proposed final regulations on rights in technical data issued by the DAR Council on April 16, 1987.

Three of the six concerns cited are in direct conflict with Sec. 953 of P.L. 99-500. The problems surrounding 1) the definition of private expense, 2) the government's finding of need, and 3) mixed funding could have been prevented if the DAR Council had more carefully considered the provisions in Sec. 953 of Title IX, in conjunction with the Statement of Managers.

However, these comments do not focus on the failure of the regulations to adequately reflect the statute. They focus on the inequities the regulations may create.

PROPOSED FINAL REGULATIONS ON RIGHTS IN TECHNICAL DATA—DAC 84-187

CONCERNS

1. Definition of private expense

The definition of private expense included at 227.471 establishes two tests for establishing private expense.

(a) the cost of development has not been paid in whole or in part by the government; and

(b) the development was not required as an element of performance under a Government contract or subcontract.

Independent Research and Development and Bid and Proposal costs, if paid by the government, do not count as "government expense."

The DAR Council has said publicly, since April 16, that the cost of development is a "flexible" term and will be determined on an "individual" basis. They rejected the Conference Report recommendation to include all indirect costs in the definition of private expense because time did not allow for consideration of all overhead accounts, individually, and the conference report direction was confusing because capital costs and profit were mentioned as indirect costs.

Under this "maybe" situation, it is possible for a contractor or subcontractor to bid, claim limited rights, win the award, have his limited rights claim challenged or his costs audited to discover that in fact, the government chooses to view indirect costs as a government contribution to development.

The contractor or subcontractor, under this system, loses the option of going into a procurement knowing the status of his rights in technical data.

A business with substantial dependence on defense markets, like any commercial business, must provide a positive return on investment to be viable. The possibility that the overhead required to maintain innovation must be supported totally by commercial markets in order for a manufacturer to maintain trade secrets in defense markets will jeopardize the investment in innovation.

By inserting "indirect costs to the government, including" after "provided, however" in the definition of private expense at 227.471.

2. The Government's findings of need

Both the policy and the procedures which guide the contracting officer's determination of need and the rights in technical necessary to satisfy that are unclear as to how the decision will be made—on an individual component basis (See 227.472-2), or on a program by program basis (See 227.473-1(b)(1).)

In 227.473-1(b)(1), the coverage states that "If Government control on the contractor's use of privately developed items, components, processes, or computer software is desired, special provisions must be included in the contract." "The coverage at 227.472-2 states that the government shall give consideration "to such factors as: whether or not the item, component, or process will be competitively acquired, ..."

In recent years, government determination of needs for rights in technical data have been made on a program by program basis. To provide for future competition, the V-22, ATF, ATB, and LHX prime contracts have included requirements for unlimited rights, dual sourcing for all components and/or expiration of limited rights. To prevent discrimination against private expense development solely on the basis of availability of rights in technical data, which P.L. 99-500 does, it should be made clear that the determination of "need" described in 227.473-2 must be applied to each item. This will allow a subcontractor to compete on the basis of better performance as well as other factors in addition to price. It will also help to assure that the party asserting rights in technical data can enjoy the protections in P.L. 99-500.

This can be accomplished by:

(a) In the first sentence of 227.472.3 after "data rights" add "to attempt" and delete ". . . in each acquisition . . ." and replace with ". . . for each individual item, component or process . . .". In the second sentence after ". . . before contract . . ." add ". . . or subcontract . . .".

(b) Change the first sentence of 227.472-6 to read, "If the Government determines that it needs rights in technical data greater than limited rights, the contracting officer may negotiate with [the] contractor or subcontractor [claiming rights in technical data on individual items, components or processes] to acquire . . .".

(c) Delete the last sentence of 227.473-1(b)(1).

(d) In the first sentence of 227.473-2(a) after "the Government may. . ." add "negotiate to".

(e) Add to the end of the first sentence of 227.472-2 "on each individual item, component and process." In the last sentence after "contractor's" add "or subcontractor's".

3. Evaluation of the availability of rights in technical data

Public Law 99-500 prohibits requiring a contractor or subcontractor to relinquish rights in technical data as a condition of being responsive or of award. The second sentence of DFARS provision at 227.472-4 places no constraints on the ability of a CO to consider availability of rights as an evaluative factor and may lead contracting officers to view the ability to evaluate the availability of rights as an exception to the prohibition. It should be stricken from the prohibition coverage.

4. Direct licensing

Many people within the Department of Defense insist that there must be two sources of an identical item, component or process in order for that item, component or process to be procured as part of a major weapon system. Irrespective of the rights in technical data clauses, this requirement is being included for participation on the ATF and other programs. In light of this approach, methods for licensing privately developed items becomes important.

The rights in technical data regulations propose licensing as an alternative to purchasing additional rights. There are two ways to license. The government may be the licensee and then distribute the technical data to other potential bidders, or the company may deal directly with another company and license that one competitor.

Although both methods are prohibited as a condition of responsiveness or of award by P.L. 99-500, obviously both the government and the contractor or subcontractor are more likely to benefit if direct licensing is used. The government's chances of negotiating with a contractor or subcontractor to establish a licensee are improved, and the contractor or subcontractor can limit the number of potential competitors who will see his trade secrets.

At 227.474-1, the proposed final regulations strongly suggest that direct licensing is not appropriate for an estimated total acquisition cost of less than $50 million of RDT&E funds or $200 million of production funds.

These thresholds effectively eliminate this option for a number of companies. When asked how and why the thresholds had been established, a DAR Council representative implied that since establishing one's own competitor was "unnatural", the government felt more comfortable being the licensee.

The threshold should be deleted from the regulation.

5. Validation

The validation provisions of P.L. 99-500 (10 U.S.C. 2321) permit the Government to challenge restrictive markings on technical data within three years of delivery or final payment based on reasonable grounds. Since subcontractors typically deliver data to higher tier contractors years before delivery to the Government, these subcontractors will be required to substantiate restrictive markings beyond the normal three year record retention period.

The three year statutory period can be equitably applied to subcontractors by adding "or subcontract" in the fifth sentence of 227.473-5(a)(1) after "on a contract".

6. Mixed funding

If the definition of private expense remains as proposed in the rights in technical data regulations, many items that have been condered to be developed at private expense will be considered to be mixed funding development.

Whether or not the Government is willing to grant government purpose license rights to these subcontractors, their value attached to their trade secrets will be destroyed when the government circulates them for reprocurement. For a small or medium size company whose entire product line is based on the same background technology, limiting the use of his know-how to potential competitors in government markets does not provide him with any protection.

Both P.L. 99-500 and the Conference Report make it clear that the disposition of rights in technical data will be negotiated when both a contractor or a subcontractor and the government have contributed to development. The regulation arbitrarily creates a formula instead of creating negotiation objectives for a contracting officer. The coverage at 227.472-5(b) should be deleted and replaced with the statutory language at 10 U.S.C. Sec. 2320(a)(2)(E).

Senator **Bingaman**. That concludes our hearing today. Thank you very much.

[Whereupon, at 5 p.m. the hearing was adjourned.]

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DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEARS 1988 AND 1989

WEDNESDAY, MARCH 18, 1987

U.S. Senate,
Subcommittee on Projection Forces
and Regional Defense,
Committee on Armed Services,
Washington, DC.

AIRLIFT, SEALIFT, AND AMPHIBIOUS SHIPPING PROGRAMS

The subcommittee met in open session, pursuant to notice, at 2 p.m., in room SR-222, Russell Senate Office Building, Senator Edward M. Kennedy (chairman) presiding.

Present: Senators Kennedy, Nunn, Exon, Gore, Shelby, Symms, McCain, and Wilson.

Staff present: Romie L. Brownlee, deputy minority staff director; Ronald P. Kelly, James R. Locher III, Norman G. Mosher, Gordon G. Riggle, Mark B. Robinson, professional staff members; Russell C. Miller, research assistant; and Lori M. Jackson, staff assistant.

Also present: Jeffrey B. Subko, assistant to Senator Exon; Gregory B. Craig, assistant to Senator Kennedy; Leon Fuerth, assistant to Senator Gore; Terrence Lynch, assistant to Senator Shelby; and Michael Jimenez, assistant to Senator McCain.

OPENING STATEMENT BY SENATOR EDWARD M. KENNEDY, CHAIRMAN

Senator Kennedy. We will come to order.

This afternoon, the subcommittee continues its review of the Defense budget. The issues today are airlift, sealift, and amphibious capability, the principal means by which U.S. combat forces are deployed in times of crisis. The caliber of these life capabilities is critical to successful military operation.

Until the past decade, airlift, sealift and amphibious forces were seriously neglected. Following President Carter's commitment to defend the Persian Gulf region, force projection has received renewed attention. Our capability has improved, but problems remain.

Today's hearings will focus on whether key programs are proceeding as intended and whether further action is needed to correct the remaining problems.

The subcommittee intends to pursue three issues.

First, we would like to hear a status report on the C-17, the new strategic airlift plane. Funds for initial procurement of the C-17 have been requested in the budget for 1988. This first step, however, puts us on the road to a major financial commitment in future years. Congress is committed to the C-17 program. The question is timing. Is the C-17 a cost effective use of scarce defense resources this year?

The second issue is our extensive reliance on ships in the ready reserve for sealift capability. Are existing vessels adequate? Will there be sufficient merchant seamen during a mobilization to crew these ships? Do we need additional fast sealift vessels with a speed of over 30 knots and rapid load and unload facilities?

The third issue is the adequacy of amphibious shipping. Our current objective is to increase by a third our ability to transport Marine assault forces in times of crisis. We hope to hear a detailed explanation of the rationale for this program and a timetable for its achievement.

Though these issues seldom receive as much attention as missiles, fighter planes, and warships, they are just as important to our national defense. Our ability to project our interests may often depend on our ability to project our forces. We need to be able to transport men and equipment to where they are needed and when they are needed.

On behalf of the subcommittee, I extend a warm welcome to three distinguished military officers who will discuss these issues: Gen. Duane H. Cassidy, U.S. Air Force, Commander in Chief, Military Airlift Command; Vice Adm. Joseph Metcalf III, U.S. Navy, Deputy Chief of Naval Operations for Surface Warfare; and Vice Adm. Walter T. Piotti, Jr., U.S. Navy, Commander of the Military Sealift Command.

We will proceed with the whole panel commenting first and will start off with General Cassidy. He is a 33 year veteran of the Air Force. He previously commanded the 63d Military Airlift Wing and the Military Airlift Command's Twenty-First Air Force. General Cassidy has also served as the Deputy Chief of Staff of the Air Force for Manpower and Personnel.

Vice Adm. Joseph Metcalf is a graduate of U.S. Naval Academy and is a 31-year veteran of the Navy. Prior assignments include Commander of the Second Fleet and Strike Force Atlantic, during which time he commanded the Joint U.S. Forces in the Grenada Operation.

Vice Adm. Walter Piotti is Commander of the Military Sealift Command. He is an experienced surface ship officer and his commands include two destroyers and a cruiser, and he has also served as Commander of the Cruise Destroyer Group Five.

We are glad to have you gentlemen here and will start off with General Cassidy.

STATEMENT OF GEN. DUANE H. CASSIDY, USAF, COMMANDER IN CHIEF, MILITARY AIRLIFT COMMAND

General CASSIDY. Thank you, Mr. Chairman. I appreciate the opportunity to appear before you and the committee today.

As much as I would like to spend all of my time talking to you about flying airplanes and particularly the C–17, if I may use some latitude to begin with, I will talk about what I think is even a more key element of my ability to project forces for our country, and those are some of the issues that have to do with our people and particularly our aircrews.

These people, as I said, are our aircrews, maintenance people, security policemen, aerial port specialists, all sorts of people that make up what we refer to as an airlift system, which is, indeed, responsive to our country's needs.

The airlift force is a combination of 93,000 active duty people and 70,000 Air Force Reserve and Air National Guard people.

I make this point to let you know that we are heavily dependent upon the Reserve forces, and they interact with us each and every day, and in whatever contingency we respond to, you will find reservists there along with us, shoulder to shoulder.

They believe in the system. They take good care of the system. They believe that there are people within the system, people like members of this committee and myself, a Commander in Chief, who will take good care of them. They look to us to represent them.

So, speaking on their behalf this afternoon to you and to the members of the committee, let me try to explain some of the gut feelings that I get as I travel around the command which I command, walking on the flight line, flying airplanes with them, walking through a maintenance hanger, wherever it is.

Our people are the brightest ever. They are great men and women. You know that. You have seen them in action. I am here to confirm that once again.

They understand the fiscal realities that you and the members of the Congress are faced with today. They understand the requirement to deal with the budget deficit and the need for all of us to work together to solve these problems, and they want me to tell you at every turn that they are ready to do their part. They believe that they do do their part in that.

They find that there is increasing need for airlift everywhere they go, whether it is moving deposed dictators around the world or moving some hay from one part of our country to another. They always seem to be called on for some instability in their lives, but, quite frankly, they are proud to be there, proud to do it, and proud to wear the patch of the U.S. Air Force and the Military Airlift Command.

However, they see their lives changing in some ways. They see an area of increasing numbers of uncertainties that are creeping into their lives, from several directions, and that is much more difficult to explain to them than the instabilities of the world.

On any given day, we have people in about 26 to 28 different countries. Our people are faced with a terrorist threat in all of these places. As a matter of fact, just 1½ years ago, about this time of year, I had two members of my command killed and 18 others wounded when a terrorist planted a bomb at one of our bases overseas, Rhein-Main Air Base.

They understand the realities of the world that they live in. They also understand the reality of a declining dollar and the value of the dollar and what that does to them, as they have to live in foreign countries or traverse foreign countries. But they learn to live with that.

I frankly tell you, Senators, that they are quite proud and you would be quite proud to see how well they and their families, their wives and children, adapt to those sorts of things—the uncertainties that are endemic to our way of life. Once again, they are proud to be able to do that.

But there are some other uncertainties that they do not understand, and, frankly, sir, it is much more difficult for me, as their Commander in Chief, to explain to them or to get some understanding from them of things that seem to come from the very people who normally take care of them, from you and me. I speak here of some of the age-old problems that many of us have dealt with over the last several years in the personnel and support arenas—increased moving costs borne more and more by the individuals themselves, rather than by the Government they serve; dental programs that lag far behind programs in the private sector; and several very major changes in the retirement system in the last couple of years.

I also speak here of more recent uncertainties, current issues that seem to be facing them all at once, coming from different areas, but all at once they are being faced with these. For instance, we are faced with an officer force reduction—1 percent this past year, which we have dealt with, but we are faced with a 2 percent and 3 percent reduction in the next coming years.

This affects our crew force. And I would like to make it a matter of record, if we ever get to the point where we have been asked to cut our officer force within the Military Airlift Command by as much as 6 percent, it will affect my combat capability. In fact, I would use the strength of the word "debilitating" to my combat capability. I would ask your indulgence and your consideration very carefully of that kind of reduction.

At the same time that we are being asked to reduce the officer force and pick up more of those sorts of duties with the enlisted force, we are being faced with an early-out program for the enlisted force. One seems to be working against the other. That is brought about by reduction in the military personnel account, which seems to be arbitrary to us. We are having a very, very difficult time in assimilating within the command and at the same time modernizing our force.

There also have been some major shifts and a reduction in the personnel PCS moves. This greatly affects our people who are stationed overseas, the ones going overseas, or coming from overseas. It creates an uncertainty in their lives that they have never had before. Also, those who depend upon some PCS moves around the country to support promotions and increased responsibility are wondering now what they can do and what this will do to their careers, while once again providing an uncertainty to them.

There are major changes in some of their morale and welfare support which they have not seen before, and they wonder why. I refer specifically to some major attacks on NCO and Officers' Clubs, those sorts of things that are considered to be a way of life in our military, those sorts of things that our people believe that our Government owes them.

The effect of all of this uncertainty—none of them particularly individually, but when you add them all up—comes down to one thing, sir, and that is retention.

The Air Force is retention oriented, particularly my command. My command has the most difficult problem in retention simply because all the people in my command have very, very transferable skills, and they transfer them much too regularly.

I cannot control the opportunities in the private sector or the lure for more attractive living and working conditions outside, but we must, therefore, focus on the quality of life issues that you and I can control: competitive pay and entitlements; family support centers; maintaining favorable tax treatment of allowances; et cetera.

Our retention rates are the lowest since 1980, the lowest in the past 7 years. The biggest hurt is all in the wrong place, as you might imagine.

We cannot ignore the trends, and I do not believe we can let these trends continue as they are. Our people are skilled, well-trained, in a very high tech training arena that is very, very expensive to do. Our pilot force most dramatically illustrates the problem and, of course, they are my combat people.

Last year, the Military Airlift Command lost 176 out of 1,500 pilots in the most critical 6- to 11-year group. Those are my supervisors, my standardization people, the guys who give check rides and do all the training.

This year, in the first quarter alone, 141 of the same year group have separated or established dates of separation.

For the next few months, the airlines are projected to hire more pilots annually than the Air Force produces in undergraduate pilot training.

I cannot buy the experience in the pilot force or universities. MIT, the University of Pennsylvania, or wherever do not produce well-trained aircraft commanders. It is not like buying a civil engineer, an attorney, or a doctor off the street.

A C-5 aircraft commander costs me about $5.6 million to train. A C-141 aircraft commander, the normal one costs about $4 million, and some of our very most experienced people will cost over $6 million to train—indeed, a $6 million man.

The C-130 Combat Talon Aircraft Commander, even for a small airplane like that, costs over $2 million.

These are the leaders of the fighting force in the Military Airlift Command. Their morale and esprit de corps directly affect all of the other crewmembers in my command, and I think we need to pay some very serious attention to what is happening.

I hope you and the committee will consider this as you consider the readiness of our airlift forces. While we do not dwell on the issue of pay or comparability, our people, quite frankly, are much too bright to ignore the issue of pay. Our people are experiencing the largest pay gap since 1979, a year marked by serious recruiting and retention problems. The pay increases over the last 4 years have helped but quite frankly, sir, they have not kept up with inflation, and there have been no real increases in the buying power of our people. As a matter of fact, for the last 6 years, we have lost buying power.

When our country decided to go to an All Volunteer Force, we committed ourselves at that time to pay comparability, and we have only achieved that twice in the past 13 years. Our people are much too proud to complain about compensation. They just do not do that. However, the perception of support from the public that they serve is a very critical element in their job satisfaction and their willingness to stay with us, so we cannot ignore it.

I hope you will consider these thoughts on people as the 100th Congress attacks the 1988–1989 budget request.

The requirement to retain quality people is an indispensable part of the Air Force's commitment to modernize our airlift resources. This is what I would like to take the next couple of minutes to talk about, that modernization program, which has been going on now since 1981.

In 1981, the Congressionally Mandated Mobility Study quantified what we knew, that there was a need for more airlift. We set ourselves a goal at that time, and I would remind the committee that it is a fiscally constrained, reasonably attainable goal. It is not the requirement.

We have set that goal to create 66 million ton-miles of capability in our airlift force by the year 1999. We have added approximately 20 million ton-miles since we set this goal and we are well on our way to meeting the goals that we have set. I am here to report to you that our figures look good.

We have recognized that our national strategy depends upon our ability to rapidly deploy or reinforce the forces the United States has in overseas areas. We have done several things.

First, with the C–141, we have stretched it and made it refuelable and increased the capability by one-third. That program was completed under cost and early.

We are rewinging the C–5 now. As a matter of fact, we are at the point where we have rewinged each C–5 we have, with the exception of the final six. They are all in rework now. Once again, that program is on schedule and under cost.

In 1982, the decision was made to procure 50 more C–5Bs and 60 KC–10s. Those programs are well underway as well. I now am operating 11 of the new C–5B models.

This will contribute an additional 12 million ton-miles per day toward our goal, with a 60 percent increase in outsized airlift.

In 1983, we started the CRAF Enhancement Program of the Civil Reserve Air Fleet.

We are under contract now with Pan American World Airways to modify 19 of their 747 passenger airplanes to make them a combination of passenger and freighter airplanes.

All of our programs to this day, as I mentioned earlier, are under cost and ahead of schedule.

Now, 1983 was a significant year for MAC. We took on the challenge of consolidating all of the Air Force special operations airlift forces under MAC. We created the Twenty-Third Air Force at that time, and we wrote a Special Operations Master Plan, for the first time laying out a roadmap for Air Force special operations forces and committing ourselves to nearly $6 billion to making sure that we adhere to what the Congress has directed, and that is to modernize the special operations forces.

We are well underway with that program.

There are airplanes on the ramp today. I was in Greenville, TX, just 3 days ago and saw the first six of our new Combat Talon airplanes under construction there.

Let me get back to our progress toward the goal of 66 million ton-miles, which the Congress and the Department of Defense have agreed upon.

Our capability to that end, at the end of 1986, was 34.2 million ton-miles toward the 66 million. We project a fiscal year 1992 capability of 51.4 million ton-miles. This meets the mid-term objective of 51 to 54 million ton-miles in the 1988 to 1992 defense guidance.

The Air Force Airlift Master Plan is the foundation for our future plans. It defines an aircraft force structure balancing utility, operational costs, manpower constraints, force stabilization, the whole thing, which includes the Air Force Reserve and Air National Guard.

We have two programs which will enable us to reach our goal. The first, which is going on now, is a Civil Reserve Air Fleet modernization program—we call it CRAF Plus—working with the private sector, evaluating these very volatile industry trends, adjusting our policies to complement any changes within the industry, such as the very rapid growth of the small package industry, and pursuing legislative and regulatory changes, contracting innovations, seeking incentives, and establishing an international defense features program whereby some day I would hope that every airplane built in this country has a defense capability of some kind inherent to it.

The C-17, then, finally, remains the cornerstone of our plan on how to get to the 66 million ton-miles. However, it is not simply the best solution to meet the present future requirements of our warfighting CINCs. Frankly, sir, it is the only solution to meeting that.

The Secretary of Defense, the Chairman of the Joint Chiefs, the Chiefs of Staff of the Air Force and Army, the Commandant of the Marine Corps, and all the warfighting CINCs are 100 percent behind this program and have so stated in Congress.

The C-17 will provide the capability to project light and heavy combat units, including outsized equipment directly forward to the battle area. It will be able to swing from its key strategic role to a theater airlift support role to deploy and resupply theater forces. It is the dream of any combat commander to get what he needs, where he needs it in a hurry.

The bottom line, sir, is that we have a plan that will take us into the next century and give an integrated airlift system that is the most responsive in the history of aviation.

As I see our national strategy evolving, we are going to need every bit of that airlift capacity we are attempting so feverishly to build.

We must take care of the people who operate this system, as I mentioned up front. Let's step back and let this plan that we have built so painstakingly—work. We have come so far. We have come a long, long way. Let us not permit short-term budgetary considerations to prevent us from finishing the job we set out to do.

I look forward to answering your questions following the presentations of the two Admirals.

Thank you, sir.

[The prepared statement of General Cassidy follows:]

PREPARED STATEMENT OF GEN. DUANE H. CASSIDY, COMMANDER IN CHIEF, MILITARY AIRLIFT COMMAND

Mr. Chairman and members of the committee, I welcome the opportunity to appear before you today and to represent the Military Airlift Command [MAC]. The Military Airlift Command is a combination of 93,000 active duty and 70,000 Air Force Reserve and Air National Guard members. We provide and maintain strategic airlift, theater airlift, special operations, and combat rescue in support of Air Force doctrine around the world. The command also includes Air Weather Service, Special Missions Operational Test and Evaluation Center, and Aerospace Audiovisual Service. This statement will give you an overview of our missions, discuss the key link to our ability to perform these missions—our people, and highlight those issues that I intend to recommend to the Congress and the Secretary of Defense as the issues of sufficient priority that they should be given your attention this session.

MISSION OF THE MILITARY AIRLIFT COMMAND [MAC]

Military Airlift Command is responsible for multiple missions performed as one of nine unified and specified commands reporting to the Chairman of the Joint Chiefs of Staff and as a major air command of the United States Air Force. As DOD responds to Executive direction to form the United States Transportation Command[USTRANSCOM] and your FY87 legislation which instituted the United States Special Operations Command [USSOC], our missions and command relationships will change. The need to modernize and expand the nation's strategic, theater, special operations, and rescue capabilities remains constant. We have designed a force modernization plan that best supports the needs of the theater CINCs, regardless of the final organization of these new commands.

As a specified commander under the current organizational structure, I command strategic and CONUS-based theater airlift, and aeromedical airlift under the direction of the President and Secretary of Defense during wartime, periods of crises, and JCS exercises. As the Commander of an Air Force major air command, I am responsible to the Secretary of the Air Force for furnishing ready forces for special operations, combat rescue, weather and environmental support, weather reconnaissance, operational support airlift, Presidential airlift, audiovisual services, and aeromedical evacuation.

U.S. Transportation Command

The United States Transportation Command [USTRANSCOM] will be a wartime-oriented unified command organized along functional lines with three components—Military Airlift Command, Military Sealift Command (MSC), and Military Traffic Management Command (MTMC). A United States transportation command was mandated to consolidate global air, land, and sea transportation for wartime operations. Primary responsibilities will include worldwide strategic mobility planning, automatic data processing (ADP), systems integration, and centralized wartime traffic management to meet National Command Authority requirements. Command establishment is set for 15 Apr 87 pending Presidential approval. We anticipate assignment of forces, to include the Joint Deployment Agency, by 1 Oct 88.

The USTRANSCOM will perform strategic mobility planning, ADP integration and will support other CINCs during strategic mobility execution. The Services will continue to have operational control of forces assigned to USTRANSCOM, responsibility for Service-unique missions, control of Industrial Funds, responsibility for Service-oriented procurement and maintenance scheduling, and DOD charters for peacetime single manager transportation operation.

U.S. Special Operations Command

The proposed United States Special Operations Command [USSOC] will incorporate a major mission of MAC. We laid the foundation for a smooth transition by enhancing our special operations resources, developing our command and control system to respond to any mission requiring special operations forces [SOF], and reorganizing 23 AF so it will be an effective component of a USSOC.

It is my opinion that, to ensure maximum support of this new command, the 23 AF Commander, who is currently under my command and responsible for all AFSOF, combat rescue and aeromedical evacuation, should report directly to USCINCSOC on operational matters, while still reporting to me on all non-SOF airlift and other command-related issues. These command relationships have not yet been determined by the Joint Chiefs of Staff. The Air Force currently has a similar arrangement between the Tactical Air Command's 9 AF at Shaw AFB, South Carolina, and its requirement to support the US. Central Command.

This command relationship provides USCINCSOC, through the 23 AF Commander, greater access to all of MAC's varied resources, including our worldwide command and control and logistics networks. We can give USCINCSOC all the support his missions demand. This approach will expand USCINCSOC's flexibility and capability while minimizing redundancy and costs.

As our new roles and missions in airlift and special operations evolve, one thing remains constant—the men and women of MAC will continue to provide this nation with the critical elements of deterrence. These are the direct products of a strategic and theater airlift and special operations system capable of projecting forces, worldwide, in defense of America and our allies.

MAC'S PEOPLE—THE FIRST PRIORITY

The people who make up this command are the foundation of our warfighting and readiness capability. They determine the success of our nation's defense. Efforts to modernize weapon systems, increase airlift resources, and improve readiness and sustainability will be fruitless if we don't have the right people. I appreciate the attention of the Congress and this committee to the needs of our men and women and their families.

Personnel initiatives

The Military Airlift Command's current force of officers, NCOs, and enlisted personnel is the most professional I have seen in 33 years of service. They take pride in MAC's mission and in serving their country. They are aware of the very difficult budget decisions ahead and appreciate that current economic conditions require the close scrutiny of every federal dollar spent. However, they are concerned about pay, job security, medical benefits, and the threat posed to them and their families as a result of terrorism. Our pilot force most dramatically illustrates the impact of these concerns. Last year, MAC lost 176 out of 1,526 pilots in the critical 6–11 year group. In only the first quarter of this fiscal year, 141 pilots in this same year group have already separated or established a date of separation. The Cumulative Continuation Rate [CCR] declined from 79 percent in FY83 to 46 percent in FY86, and we project a 40 percent rate by the end of this fiscal year. We are still able to man our aircraft, but continued losses will result in declining experience levels in our pilot force.

We have concentrated our efforts toward improving job satisfaction and enhancing mission identity. People who derive a sense of pride and worth from their mission are far more productive and more likely to remain in the Air Force for a full career. Our leaders at the unit level are using all our resources to reduce irritants and create satisfiers within their organization. This approach requires initiative and creativity, but we will see great dividends.

More than every before, a decision to stay in the Air Force is a family decision. The Family Support Centers meet the needs of our families. Through these centers we respond to family issues on a local level, such as concerns and problems that impair productivity, morale, and career goals. Specifically, we provide a PCS-relocation support, support during duty separations, spouse-employment consultation, support during crisis, financial management assistance, and assistance for those families with special needs.

Our commanders report Family Support Centers improve mission readiness, increase retention rates, lower IG complaints, improve unit morale, and promote a high family commitment to the Air Force way of life. We had seven Family Support Centers open in MAC at the end of FY86, and our goal is to provide a Family Support Center at every MAC base by the end of FY88.

As much as these efforts and programs, help, the perception of support from the public they serve is a very critical element in job satisfaction. The people of MAC are too proud to complain about compensation. They joined to serve the United States and believe that their government will take care of them. Since there is no representation for them other than you and me—let me give you an opinion.

We need to make sure the signals we send show them we appreciate what they do. They realize there must be some belt tightening, but they have done that. Recent budget cuts have caused reductions and delays to pay increases, PCS freezes, and changes to the retirement system. They are afraid that similar erosion might occur to other entitlements. The recent arbitrary officer reduction will have a devastating impact on our retention. We must have your support to change this perception.

Pay comparability

The heart of the total compensation package is pay. Based on the Employment Cost Index [ECI], we are 9.4 percent behind the civilian sector. Our people are experiencing the largest pay gap since creation of the all volunteer force (AVF), including 1979—a year marked by serious recruiting and retention problems. That fact is not missed by our people. When Congress decided on an all-volunteer force, we committed ourselves to pay comparability. Today, we have no extra personnel and no cushion, as in the post-Vietnam era of the 70s, to soften the blow of poor retention. We must provide our people with adequate and equitable pay to induce them to make a career of the Air Force.

Aviation career incentive pay

The most time consuming and expensive people to train and retain are pilots; and a key compensation issue with them is Aviation Career Incentive Pay (ACIP). The ACIP has not been increased since FY81, and based on current projections, it will have suffered a 27 percent loss in buying power by FY89. The positive effect that an ACIP increase would carry far outweighs its expense. The entire Air Force ACIP budget of $140 million pays for itself when we retain just 35 pilots. Retaining only nine more pilots would pay for a 25 percent increase in ACIP. As important as these numbers are, the current drain on our pilots cannot be measured simply in monetary costs. Experience cannot be replaced quickly, it takes time. I can not hire a C-141 aircraft commander off the street, it takes 3 to 6 years to train him or her.

Permanent change of station expenses

PCS out-of-pocket costs are another decisive factor in both the career decision and the morale of our members. Our surveys show that the government reimburses only about $1 for every $3 of moving costs our people incur. We made significant progress with the authorization of programs such as doubling dislocation allowances and the temporary lodging expense program. However, we will be working in future budgets to resume full funding of these programs. The increased household goods weight allowances for our junior enlisted members were a much needed and appreciated improvement. Your continued support for household goods allowance increases for the remaining grades and for other related reimbursement initiatives is still needed.

Military construction

The Military Construction Program [MILCON], which includes funds for Military Family Housing Programs, is vital to the morale, welfare, retainability, and productivity of our people. We have many buildings that have exceeded their design life, yet we are only maintaining a level of MILCON modernization investment which equates to a replacement cycle of over 100 years. Our current programs reflect the budget constraints; these programs must not be reduced if we are to satisfy our minimum essential needs. Clearly, we need increased congressional support of our MILCON requirements.

Officer reduction

The 1 percent active duty commissioned officer reduction directed by the FY 87 DOD Authorization Bill requires us to decrease MAC officer force by 228 positions. We will work to absorb this cut with a minimal impact on our war-fighting capabilities. Additional cuts to effect a 2 percent reduction in FY 88 and a cumulative 6 percent reduction by the end of FY 89 will most certainly cut into our crew force.

As a flying command, our fighting forces are largely made up of officers located in first-line operational units. Half of our officers are in Operations; most of these are aircrew members. For example, a basic C-130 crew consists of three officers and two enlisted members. Any officer reduction directly impacts our combat capability. The other half of our officer force, which provides support and sortie generation, must absorb the brunt of the reduction. These reductions as well as the manpower constraints imposed over the last several years force us to absorb additional workload without additional manpower. Consequently, we had to increase our reliance on contractors and convert military positions to civilian. While these adjustments have helped ease the problem in terms of our labor force, they prevent us from adequately satisfying our military management force requirements.

These reductions will exacerbate our pilot retention problem and could adversely affect other career fields. Arbitrary cuts not based on programmed actions or workload cause a perception within the ranks that reductions in force may occur at any time, leading some of our best and brightest to seek opportunities outside of the military. The reduction in personnel funding included in recent appropriations legislation is already having a direct effect on the present promotion rate of the officers who successfully competed in our selection process. As a result, the sudden slowdown in the rate of monthly promotion increments extends the date when we are able to promote those officers already selected. This inhibits our ability to keep the impetus our promotion system needs to support retention goals. This promotion slowdown telegraphs an undesirable message to our officer corps, hurting our ability to retain the quality officer force our promotion system is designed to achieve.

Permanent change of station [PCS] funding reductions

Our people are watching changes to PCS policy very carefully. They perceive many policy changes as harmful to their ability to enhance their career through broadening and higher-level assignments. We cannot force our people to remain overseas or in undesirable locations for too long a period. The uncertainty this creates, in a time when our people are searching for stability and are frustrated by changes, will exact an unacceptable price in terms of retention; a tremendous amount of turmoil to achieve a relatively small savings in PCS dollars.

Medical and dental care entitlement

A perception of erosion is most evident in our medical and dental care entitlements. Military health care was once a top career incentive in that there were few comparable civilian programs. Over the past few years, however, the civilian sector has made great strides in providing care to employees. Meanwhile, the military system has changed little, leaving the impression our programs have eroded. The quality of our health care has not eroded, in fact, comparisons with civilian counterparts all indicate we are providing as good if not better medical care. One exception to this is our dependent dental care. Civilian dental care programs have far outdistanced the military. Our people are watching the new dependent dental care insurance program scheduled to go into affect in August, very carefully. I consider it a top priority—we need it!

Quality of medical care

Medical care is critical to our military personnel and their families. To ensure that we provide the best care possible, our hospitals and clinics receive extensive reviews by civilian, Air Force, and federal agencies. The Joint Commission for Accreditation of Hospitals reviews all of our larger facilities. Air Force hospitals have been accredited 100 percent of the time. We have several post-graduate training programs for physicians. One indication of the high quality of our training programs is that our graduates enjoy success rates that exceed the average by a wide margin. The Air Force IG conducts a comprehensive review of all aspects of medical practice of each facility on a 2-year inspection cycle. The steady improvement in the quality of medical care is evident from these inspections.

The quality of newly-accessed doctors has never been better. The graduates of the scholarship program and of the Uniformed Services University of Health Sciences have been selected from the top quarter of medical school candidates, and they comprise nearly 60 percent of our present professional medical force. Improved reviews of prospective recruits have virtually eliminated the chance selection of substandard professionals. We are committed to provide our people with the best medical care available.

Enhanced terrorist defense procedures worldwide

One of my immediate concerns and our greatest peacetime threat is international terrorism. MAC aircrews and aircraft are highly visible in all parts of the world and, therefore, are prime terrorist targets. Since 1980, more than 30 percent of all international terrorist incidents were directed against Americans. For example, on 8 Aug 85 MAC's Rhein-Main Air Base, Germany, was bombed by suspected Red Army Faction members, killing two members and wounding 18 other personnel of my command. Property damage totaled $300,000.

To combat this threat, we have a far-reaching, coordinated, terrorist defense program designed to reduce the vulnerability of our people, aircraft, and facilities. This program begins with the need for the best intelligence we can gather followed by an aggressive awareness training campaign that includes command-wide distribution of MAC's Family Protection Workbook. Positive planning for security enhancement will reduce the vulnerability of our installations to include considerations for public facilities such as base exchanges, schools, and hospitals. Future security enhancement projects include fencing and lighting on the flight line, base perimeters, and key facilities. This program will cost $7.88 million, with the projects beginning this fiscal year and continuing through FY92.

We have improved police procedures, including our hostage negotiation capability. To insure a uniform command antiterrorism program, we have implemented a thorough self-evaluation program. This Antiterrorism Survey and Evaluation Team review of all MAC bases is two-thirds complete.

We are also concerned about the security of our missions, both military and civilian contract, operating throughout the world. We schedule armed mission security teams to accompany our military aircraft into threatened areas and are working with the FAA to develop the capability to provide security police to augment federal sky marshals on MAC contract flights during high-threat situations. We are also improving security at our gateways in civilian terminals and at all military terminals served by MAC aircraft.

For any of these programs to be successful, we need accurate and timely intelligence from the national intelligence community and intelligence producers in theater. The development of the Military Airlift Intelligence System (MAIS) will provide our crews and planners timely threat assessment.

STRATEGIC AND THEATER AIRLIFT ISSUES

The majority of MAC's resources are committed to our strategic and theater airlift forces. Our national strategy depends on the ability to rapidly deploy or reinforce forces from the U.S. to an overseas trouble spot. Only airlift can deploy forces when land or sea access is limited, when forces are required deep inland, and when timeliness is vital. Once forces have been deployed, strategic airlift continues to provide an air bridge of resupply to the theater of conflict.

Theater airlift provides mobility and resupplies to our fighting forces. Delivery may be by airland or airdrop. As the commander responsible for both strategic and theater airlift, I can shift aircraft between these two functions as the situations dictates. Our ability to perform both airlift missions will be greatly improved by the addition of the C-17 with its strategic, direct delivery, and theater capabilities.

During peacetime, we exercise the system daily. In a low-intensity conflict, we transport the forces that spearhead the attack. During a global crisis, delivering the troops and equipment fast and resupplying them could reduce the threat of escalation. We have included programs to modernize our airlift force in previous budgets, and we need your understanding now. The decisions made during your review of the President's Budget will directly affect how well we perform these tasks today and our ability to counter tomorrow's threats as we head into the twenty-first century.

Requirements

Strategic.—A combat unit, no matter how well trained and equipped, cannot influence the outcome of a conflict unless its firepower is available to the battlefield commander. When timely arrival is necessary, there is no substitute for airlift. The Congressionally Mandated Mobility Study [CMMS], published in 1981, recommended a fiscally constrained and attainable goal of 66 MTM/D; however, the identified strategic airlift requirement is much greater than this.

The Military Airlift Command is making steady progress toward meeting the 66 MTM/D target. Our current capability is 35.4 MTM/D, and we project an FY92 capability of 51.4 MTM/D which meets the FY88-92 Defense Guidance midterm objective of 51 to 54 MTM/D. This increase is achieved by the rewinging of the C-5A, the full delivery of KC-10As and C-5Bs, Civil Reserve Air Fleet growth and enhancement, and the initial C-17 procurement. The C-17 remains the cornerstone of our plan to attain the 66 MTM/D goal.

Theater.—While we have been successful in quantifying strategic airlift requirements and establishing a clear goal for that capability, we have not been as successful in establishing a similar goal for theater airlift. Theater airlift needs are the most difficult mobility requirements to quantify. They depend not only on the quantity of material to be moved from the staging bases to units in the field but also on the daily fortunes of war. Theater requirements vary with each attack or advance. Nevertheless, we have initiated a significant effort—not yet complete—to clearly document our theater needs.

In the May 84 Memorandum of Agreement [MOA] on the Joint Force Development Process, the Chiefs of Staff of the Air Force and Army agreed to establish a joint office to address airlift issues. In response to the MOA, we established the MAC-TRADOC Airlift Concepts and Requirements Agency [ACRA] in Oct 84. As their first task, ACRA completed the Qualitative Intratheater Airlift Study [QITARS] in Jan 86. The study defines, from a qualitative standpoint, theater airlift requirements to support the deployment, employment, and sustainment of combat forces. This was a unique effort in that Service doctrinal experts and unified commands were involved in identifying the requirements. The study verified some very clear priorities for qualitative improvements in our theater airlift force and confirmed our need to deliver personnel and cargo, including outsized, into small, forward, austere airfields. ACRA is also working closely with the OSD/JCS Worldwide Intratheater Mobility Study [WIMS] Group attempting to further quantify theater mobility requirements.

All Service components need theater airlift support. Army heavy and light forces require many of our most important theater airlift programs. Light forces are especially dependent on airlift. The light infantry division seizes the initiative by deploying rapidly and by conducting operations immediately. They have little organic ground or air transportation and only 48 hours of sustainment when deployed. Additional corps support packages, including outsized weapons, must also be delivered to support these forces. Light forces require the direct delivery and rapid resupply capability of the C-17.

Capability

The Air Force airlift system blends active duty, Air Force Reserve [AFRES], Air National Guard [ANG], and the Civil Reserve Air Fleet [CRAF] personnel, aircraft, and equipment into a national airlift force. We call upon this force in varying degrees to meet contingency or wartime requirements. MAC operates C-5, C-141, and C-130 aircraft in the United States, Europe, and the Far East. In peacetime, we exercise the total MAC system, maintain combat readiness, provide joint training, humanitarian assistance, and, as a by-product, provide peacetime airlift for DOD and other government agencies. In wartime, this system surges to provide airlift to any part of the globe within hours.

The military airlift fleet is capable of strategic and tactical operations. The C-5, KC-10, and C-141 are normally associated with strategic airlift operations, while the C-130 is associated with tactical operations. However, during a contingency requiring the rapid deployment of forces, we will use the best aircraft or combination of aircraft to achieve our objectives.

Total Force Plan.—The DOD Total Force Plan is the foundation for our current and future airlift force mix. The policy is to place units in the AFRES and the ANG that will have high wartime, but low peacetime, utilization and to maintain an active force which is responsive in peacetime and integrates all our forces.

The USAF Airlift Total Force Plan [ATFP], which the Secretary of the Air Force and Chief of Staff of the Air Force signed on 17 Sep 84, details our long-term goals for the active duty-AFRES/ANG force mix and provides a recommended schedule for transferring additional assets to the AFRES and ANG through the 1990's. Recent budget reductions have forced us to change the force mix by decreasing the number of active duty units available. Even with these changes, the force mix is still viable and continues to be validated daily.

Recommended Force Mix.—The recommended long-term force mix assigns 40 C-5s, 80 C-141s, 48 C-17s, and 152 C-130s to organic AFRES-ANG units and 70 C-5s, 100 C-141s, 132 C-17s, and 190 C-130s to active or Active/Reserve Associate units. We currently have a total of nine C-5s at the AFRES unit at Kelly AFB and at the New York ANG unit at Stewart IAP. We began the transfer of 16 C-141s to the Mississippi ANG at Thompson Field and the AFRES at Andrews AFB in FY 86. Thus far, 12 have transferred with the final four scheduled for Apr 87.

The following charts depict the aircraft transfer and resultant crew force mix plan for the turn of the century. We believe our plan will provide us a force fully capable of executing national strategy if we are not required to further reduce additional active duty units as a result of budget constraints.

ACTIVE/AFRES-ANG/AIRCRAFT-COMPARISON

AIRCRAFT	FY87	FY92	FY00
C-5	66*/9	70*/40	70*/40
C-141	222*/12	202*/32	100/80
C-17	0/0	12/0	132*/48
C-130	202/296	192/260	190/152
TOTAL %	61/39	59/41	60/40

ACTIVE/AFRES-ANG/CREW COMPARISON %

AIRCRAFT	FY87	FY92	FY00
C-5	47/53*	38/62*	38/62*
C-141	48/52*	45/55*	56/44
C-17	0/0	60/40*	50/50*
C-130	41/59	42/58	56/44
TOTAL	45/55	43/57	51/49

*Includes Active and Reserve Associate Program

Civil Reserve Air Fleet Enhancement.—U.S. civil air carriers possess the greatest airlift capability in the free world. The CRAF enhancement program provides DOD a cost-effective means of adding cargo capability by either modifying existing passenger aircraft or contracting with a carrier to build new aircraft in the cargo-convertible configuration. The features we add to these aircraft include a cargo door, stronger flooring, and a cargo-handling system to secure cargo pallets to the floor. For some civilian aircraft, DOD will finance the modifications necessary to convert from passenger to cargo configuration and all additional costs associated with operating this heavier aircraft. If the carrier wants to use the cargo capability, the DOD will only pay for 50 percent of the cost of the modifications. Using this method, life-cycle costs to DOD for CRAF-enhanced aircraft are significantly less than if we bought and operated aircraft.

Military Airlift Command contracted for one new United Airlines DC-10, one new Federal Express DC-10, and the retrofitting of 19 Pan American B-747s. In March 1986, a Pan American converted aircraft, the "Clipper Sea Serpent," flew in an exercise in the Pacific theater with excellent results. The CRAF program provides valuable airlift for MAC, and we look forward to the additional capability provided by the CRAF enhancement program.

Readiness and sustainability

Training.—The goal of aircrew training is to prepare MAC, AFRES, and ANG crew forces for rapid global force projection. The most direct method of achieving this is to improve the overall quality and effectiveness of our aircrew training programs. The highly experienced senior crew force of the Vietnam era is being replaced by younger, less-seasoned aircrews. In the meantime, the volatile, high-risk environment of today's world increases the complexity of our mission. To offset the fundamental lack of experience in combat operations, we must maximize our training effectiveness and make it more realistic. It is imperative that we train the same way we expect to fight.

We began an aggressive program to revolutionize our aircrew training programs by incorporating a civilian-contracted, state-of-the-art aircrew training system [ATS]. We can now provide a total training package that combines ground and simulator training. The goal is to provide self-paced, advanced training technology using proficiency-oriented training for our aircrews. Employing a systems approach will improve quality of our training and at the same time reduce costs. The C-5 ATS began Jan 87, and we plan to contract C-130 ATS in Mar 87. Additionally, we are pursuing ATS funding for our SOF fixed wing and C-141 aircrews. Both major aircraft acquisitions in MAC's future, the C-17 and CV-22, will incorporate ATS. Your continued support in funding ATS will provide a much more capable force and a cost savings to the country.

Operational Support Aircraft [OSA] Pilot Seasoning.—OSA is an excellent cost-effective vehicle to season new pilots. Comparing the cost of training a C-5 aircraft commander versus "aging" a pilot first in OSA saves over $7 million per pilot. It's clear that OSA provides our major weapon systems with seasoned pilots at a fraction of the cost, so we must maintain a sufficient and stable flying hour program.

Reliability and Maintainability.—MAC is enhancing readiness through reliability and maintainability [R&M] improvements. We are dedicated to improving those components which often fail and require lengthy repair times. Through systematic analysis of each weapon system, we have pinpointed areas needing improvement and have developed measures necessary to correct them. Improving R&M will ensure that logistics can generate the aircraft required and reduce en route maintenance actions.

We cut into our C-5 R&M as a result of recent budget cuts. Two major modification programs were impacted, the Main Landing Gear [MLG]/Door Actuation System Modification and Malfunction Detection, Analysis and Recording System [MADAR] II Modification. The MLG actuation system is our top priority. The current system is plagued with failures which have caused 27 aircraft mishaps and have cost $560,000 in repairs during FY 85/86. This modification will install the improved, simplified C-5B actuation system. Similarly, the MADAR II replaces a logistically unsupportable system with state-of-the-art digital electronics and should improve our C-5 mission capability rate.

Spares.—Aircraft replenishment spares received excellent funding over the past few years, and we anticipate meeting 100 percent of our requirements for peacetime operating stocks for FY 88 and 89. There are two shortfalls impacting our sustainability efforts. First, war reserve materiel [WRM] funding for war readiness spares kits and base-level self-sufficiency spares (WRSK/BLSS) for FY 88 will only meet 58 percent of our requirements. Other war reserve materiel [OWRM] requirements are not funded for either FY 88 or 89. The OWRM shortfall is $240 million. We must have continued full funding of these requirements to maintain full spares capability.

Force modernization

C-17.—The C-17 is not simply the best solution to meet the present and future airlift requirements of the war-fighting CINCs—it is the only solution. The Secretary of Defense, Chairman of the Joint Chiefs of Staff, Chiefs of Staff of the Air Force and the Army, Commandant of the Marine Corps, and all the war-fighting CINCs have testified that they are 100 percent behind the C-17—we need this aircraft.

The C-17 will provide the capability to project light and heavy combat units, including any outsized equipment. When needed, it will be able to deliver these units directly to the forward battle area, ready for combat. It will be capable of swinging from its key strategic role to the theater airlift role to employ and resupply theater forces. Especially critical is the sustainment phase; only the C-17 could move the large quantities of munitions, fuel, and outsized cargo needed by the Army's highly mobile ground and aviation forces directly to the fighting in forward areas. Finally, with its low manpower requirement and decreased operating and support costs, the C-17 will minimize life-cycle costs and provide the most affordable solution to the nation's airlift shortfall. A cost-effective and capable force multiplier, the C-17 will revolutionize the way we deploy and sustain combat forces.

The C-17 program recently received congressional approval for long-lead items for production lot 1. To meet the 12 aircraft FY 92 initial operational capability, we must realize full production funding this year. The Air Force has submitted the C-17 as a candidate for the Defense Enterprise Program—an outgrowth of the Packard Commission recommendations to achieve funding and schedule stability for selected critical programs over a 5-year period.

The Air Force has completed its production readiness review of the Douglas Aircraft Company and found the company to be in excellent shape to begin the production phase of the program. Critical design reviews will start toward the end of this year, with anticipated completion by the end of FY88. We need your help and commitment to press forward with the final phase of our plan to build the C-17 and solve the airlift shortfall. A letter to various congressional subcommittee chairmen from the Chiefs of Staff of the Army and the Air Force and the Commandant of the Marine Corps best summarized the need and urgency as follows:

"We have examined the airlift modernization issue from every angle and are convinced that the C-17 is the solution. It is not only the most cost-effective solution but gives us the greatest capability—a capability that we must have if we are to meet our country's airlift requirements.

The C-17 has been jointly supported from the ground up and is crucial to the deployment of our combat forces. The key to victory in any future conflict lies in our ability to project our power into the battlefield. The C-17 is vital to projecting this power."

CRAF PLUS.—CRAF PLUS [Partners in lift for the US] is a Military Airlift Command initiative designed to insure that we keep pace with the rapidly changing airline industry by evaluating airline trends and adjusting our policy to complement any changes.

Today's civil aviation industry is a dynamic business. Since deregulation, we have witnessed mergers, seen the growth of the overnight package carriers, and observed changes in the fleet compositions of the airlines. Our current CRAF policies may be inappropriate for maintaining the airlift augmentation we need from the CRAF.

The components of CRAF PLUS include setting goals for CRAF capability, pursuing appropriate legislative and regulatory changes, contracting innovations, seeking incentives, and establishing a National Defense Features Program (NDFP).

Allied Augmentation.—Additional commercial airlift augmentation is available to us through two other sources. The NATO Council initiated the NATO Civil Air Augmentation (NCAA) program to improve our reinforcement of Europe. Each country commits aircraft to the support of the reinforcement effort. The Supreme Headquarters Allied Powers Europe (SHAPE) allocates those committed aircraft to the U.S. for inclusion in reinforcement airlift plans. Currently, 11 nations have committed a total of 28 cargo, 53 passenger, and 12 combination aircraft. The second source of augmentation is through an agreement with the Republic of Korea; we have established the procedures to use Korean Air aircraft during contingencies. There are nine aircraft currently committed to this arrangement.

SPECIAL OPERATIONS FORCES

Our special operations forces [SOF] are trained, equipped, and organized to conduct unique operations in pursuit of national military, political, economic, or psychological objectives. Special operations are conducted across the spectrum of conflict, from counterterrorism to global war. They include unconventional warfare, counterterrorism, collective security, psychological operations, deception, direct action missions, and intelligence collection and reporting. The success of all these special operations requires the responsiveness and flexibility provided by our SOF aircraft. The 23 AF provides this user-responsive force and is supported by MAC's worldwide airlift system.

The readiness of SOF to perform its mission depends on the personnel and materiel resources provided and how well those resources are trained and maintained. Our recently completed HQ USAF-chaired SOF study and resulting budget provide a sound timetable with adequate R&D to provide the necessary force structure. We are aggressively pursuing modernization programs for all of our SOF aircraft. With your continued help and funding of the FY87 supplemental appropriation for SOF aircraft and FY88-92 FYDP, we will achieve a quality special operations force.

Force modernization

AC-130 Gunship.—Both the capability and reliability of our 10 AC-130H gunships will be significantly improved by an ongoing modification program. When final installation is complete in FY92, these aircraft will be equipped with improved fire control computers, navigation equipment, and sensors. Further improvements, particularly to radar and sensors, are timed to take full advantage of other systems being developed for the proposed follow-on gunship (AC-130U).

We plan to replace the 10 AC-130A, our oldest and least reliable gunships, with 12 new AC-130U's. These aircraft will be equipped with the improved radar, gun, and sensor systems needed to make them both more capable and reliable in the austere environments in which they are often employed. We plan to field the first of our new gunships in FY90 with deliveries through FY93.

HC-130.—Programmed improvements on 31 HC-130s include Night Vision Goggle [NVG] lighting, and communications, navigation, and defensive equipment. In addition, installation of aerial refueling systems on 21 HC-130s will almost double our air refueling capability by FY92.

MC-130.—Our aging fleet of 14 MC-130E Combat Talons is undergoing modifications to add new capabilities and increase reliability and maintainability. Phase I of this effort began in Oct 86, and we will see the results by Dec 87. These aircraft will have a dual-precision-accuracy inertial navigation system, added defensive capability, a rapid communication system, and a more reliable terrain following radar. Phase II will begin in FY88, adding electronic countermeasures equipment common with our Combat Talon II aircraft. To further enhance our capability, we will modify eight MC-130Es to a tanker configuration. After this modification is complete, we will have 14 tanker-modified MC-130Es. All of these improvements should be complete in FY92 if funding remains constant.

Our FY88-92 FYDP budget now includes the buy of 24 MC-130H Combat Talon II aircraft. We will have an initial operational capability in FQ2/89 and final delivery in FY91. These aircraft will increase our long-range special operations capability and support congressional direction to revitalize our special operations forces.

C-130E All Weather Aerial Delivery System [AWADS] and Special Operations Low Level II [SOLL II).—The ability to augment our core SOF with enhanced C-130E SOLL II aircraft during contingency operations will greatly improve our ability to satisfy National Command Authority taskings. We will do this by modifying 11 C-130E AWADS aircraft to include NVG lighting and improved communications, navigation, and defensive equipment. We will complete this modification program in FY91.

C-130 Self-Contained Navigation System [SCNS].—The first trial installation of the C-130 SCNS began in Jan 87 and will enable C-130E/H, C-130E (AWADS), and HC-130 aircrews to accomplish their wartime missions without relying on ground-based navigation aids which are susceptible to enemy jamming or deception. System capabilities include precision navigation (accuracy of 0.25 nautical miles per hour), better management of all communication and navigation radios, and planned integration with the Global Positioning System [GPS] and Microwave Landing System [MLS] as they become operational. The first SCNS-equipped theater airlift wing should be operational in FY89 with full operational capability achieved in 1990.

H-53.—We are converting all Air Force inventory H-53s to the new MH-53J PAVE LOW III-Enhanced configuration. This modification includes improved navigation, communication, and defensive systems and will provide a long-range, night, adverse-weather capability. We expect deliveries beginning in FY87 and ending in FY90. The FY87 Supplemental Appropriation includes funds to complete the PAVE LOW III-Enhanced program and modification for both shipboard compatibility and increase gross weight operations. It also addresses the funding for associated spares and a PAVE LOW III simulator.

C-141 Special Operations Low Level II [SOLL II].—Like the C-130, the C-141B aircraft possess no special equipment for performing the SOLL II mission other than NVGs worn by specially qualified aircrew members. To enhance our capability, 13 C-141Bs are programmed to receive several SOLL II improvements in FY89-92. These improvements include NVG compatible lighting; defensive systems to include radar warning receivers, missile warning receivers, and flare/chaff dispensers; NVG heads-up display; and forward looking infrared [FLIR] sensors. These modifications will increase our ability to provide timely response in contingency and crisis situations, increase our survivability, and greatly enhance mission success. Funds in the FY87 Supplemental Appropriation accelerate these improvements beginning in FY87.

CV-22.—The CV-22 tiltrotor will add a new dimension to our SOF forces and fill a critical void in our capabilities. Compared to existing helicopters, the CV-22 can carry an equal payload at twice the speed, over twice the distance, at half the cost. It will increase our ability to deploy over long distances, low level, at night, with decreased chances of detection. It can self-deploy to Europe or the Pacific without tying up other valuable resources. It will provide theater CINCs with flexibility and reliability to successfully accomplish counterterrorist, low-intensity conflict, and general war missions.

The CV-22 is currently being developed under contract by the Navy. By taking advantage of a program that's already under development by DOD, we gain significant savings. Additionally, the operating and support costs, which historically account for 60 percent of the life-cycle cost of a program, will be less than half of those of an alternative helicopter fleet because of the intrinsic efficiency, reliability, and maintainability of the CV-22. We have programmed for a minimum of 55 aircraft.

In short, it is the practical, long life, "work horse" aircraft that will provide the consistent, reliable service we need with maximum survivability. The CV-22 is a United States technical initiative worthy of a long-term national investment.

Defensive Systems.—We are in the process of quantifying the defensive system requirements for airlift and SOF aircraft. Several modification programs will equip our SOLL II and rescue aircraft with basic warning receivers and flare/chaff dispensers. We are also exploring potential ways to provide protection for all our airlifters through the use of defensive kits. These kits would be installed selectively depending on the mission. A majority of our C-5 aircraft are scheduled to receive warning receivers and flare/chaff dispensers to counter the infrared threat from terrorist activity around the world. The Combat Talon, AC-130H, and the MH-53 are scheduled to receive a variety of improved warning receivers, flare/chaff dispensers, and some jamming equipment. The SOF mission requires that these aircraft survive by avoiding detection or successfully evading any engagement.

C-STOL.—The C-STOL initiative is a response to our immediate need for short takeoff and landing airlift. As a rugged, simple, light transport, it will provide a quick reaction capability for our forces unattainable with the current airlift force. Using the numerous short, unimproved airfields throughout the world, this aircraft will transport troops and supplies into areas inaccessible to C-130s and beyond the range of unrefueled helicopters. In low-intensity conflict, where time is often critical to mission success, the C-STOL will provide the airlift necessary in a timely fashion.

We anticipate this aircraft to be an off-the-shelf acquisition, as such, we save the time and money required for R&D while gaining the reliability and confidence of a proven system. We have programmed for the purchase of five aircraft in FY88 and five in FY89. We ask for your support for this essential program.

COMBAT RESCUE

The history of air operations during any level of hostilities validates the need for a credible combat rescue system. The responsibility to perform this vital Air Force mission rests squarely on this command's shoulders. We have been unable to maintain a combat rescue force capable of flying extended ranges and protecting itself from today's increased threats. Recently, the Libyan raid proved we must retain a true combat rescue capability. Similarly, we must be responsive to peacetime disasters such as the Dec 86 fire on the Norwegian research vessel in which 19 lives were saved. It is evident that we cannot permit our rescue forces to erode further. I believe that now is the time to commit to buy additional H-60s. By doing this, our future combat rescue force will be credible, maintainable, and affordable.

UH-60 Mod/Acquisition.—The MH-60G is an upgraded UH-60A that will meet a portion of the Air Force combat rescue and special/contingency operations requirements. To upgrade combat mission capability and survivability, the MH-60G will receive extended range, improved low-level navigation and communication capability, and defensive systems. All MAC UH-60s will upgrade to the MH-60G configuration. The MH-60G will be capable of a wide range of combat missions during day and night operations, but will not be capable of operations in adverse-weather conditions.

AEROMEDICAL AIRLIFT

Last year, I addressed concern on our inability to provide all our aeromedical airlift patients the quality of service they needed and deserved. We are working new initiatives that promise to prevent further degradation of that service at minimal additional cost. We are developing a test program with the Air Force Reserve units that will reduce both the long ground transportation time and the average length of time from pickup to delivery of patients to their destination hospitals. Of equal importance, this program provides valuable "hands-on" live mission training for additional Reserve Forces crewmembers who would be caring for our casualties in wartime.

We are eliminating a wartime shortfall in our ability to evacuate casualties from the theater to CONUS. Agreements to establish a dedicated aeromedical segment in the CRAF are finalized, and full operational capability will be realized by Sep 91. The equipment, consisting mainly of stanchions to convert civilian airliners to flying ambulances, is compatible with existing aircraft as well as those coming off the assembly lines of our major aircraft companies. Last June, we proposed to NATO that the allies use the same type of equipment on NATO civil airlines within Europe for theater evacuation of all NATO casualties. We will continue initiatives such as this in the future to increase our wartime capability in aeromedical airlift.

COMMAND AND CONTROL [C2]

MAC C2 and communications computer upgrades

The steps we are taking to retain quality people and modernize our airlift fleet will provide an unparalleled force projection capability. To complement this capability, we must continue to develop our command and control systems. Our global commitment may involve such scenarios as monitoring a 9 ship airdrop mission to the European Theater, positioning a SOF team, coordinating the rescue of an aircrew, or directing an isolated combat control team in the deserts of Africa. To accomplish any one of these scenarios requires a state of the art command and control system.

The HQ MAC Command Center is our primary interface with the National Military Command Center, the other CINCs, and the Air Force Command Center. From this center, we initiate emergency actions in support of the JCS Crisis Action System. Because of the variety of our missions and our worldwide responsibility, the MAC command, control, and communications structure is necessarily complex.

Our main challenge—near real-time control of MAC missions operating into austere locations with minimal communications. Our present communications infrastructure does not provide adequate worldwide coverage. Our information processing and scheduling functions require more automation and durability, and our transportable shelters are old and limited in quantity.

We began a concentrated effort to build a secure and survivable system in the early 1980s—but we have a formidable task ahead of us. Adaptive HF communications will form the backbone of our upgraded system. Portable UHF satellite communications will complement long-haul HF communications during contingencies and the initial phase of a buildup. Automated information processing capability distributed throughout all echelons will reduce dependence on these communications and provide a greater degree of stand-alone capability. We will then interconnect automated systems throughout MAC's worldwide structure. Integration of our major communication-computer systems will result in numerous efficiencies and a greater flow of information to all echelons within MAC.

SOF C2

Enhancement of our special operations forces [SOF] communications capability is critical. SOF units are employed worldwide and must be capable of operating autonomously from austere locations. The sensitivity of their mission demands emphasis on secure, jam-resistant radios throughout the SOF command and control structure. All planned enhancements are readily adaptable to the new command and control concepts of a unified SOF command.

We identified 19 communications upgrades necessary to correct deficiencies in SOF connectivity, coverage, security, survivability, and ability to operate in a hostile environment. Local area networks are planned both within individual operation centers (to gather command and control, logistics, transportation, and intelligence data) and between operation centers (to pass information critical to intermediate and higher headquarters planners). Communications between operation centers will be routed through many different transmission systems, assuring that information can be passed despite degradation of communications. Units with mobility missions will have improved C-130 transportable vehicles configured to accept computer and communcations systems. We will use these systems in day-to-day operations, thus avoiding "learning-curve" difficulties upon deployment.

Implementing these upgrades centers on purchasing off-the-shelf technology, takes advantage of ongoing DOD programs, and minimizes the need for additional manpower. Delays in these programs will severely limit our ability to perform contingency and wartime missions.

Command center upgrade

We have made significant improvements in the HQ MAC Command Center with hi-tech equipment to increase our control of information. The most important is the implementation of the Global Decision Support System [GDSS]. GDSS, a high-speed distribution network interconnecting HQ MAC, the Numbered Air Forces, and the Airlift Divisions, has no single point of failure within any echelon or across the aggregate network. Information passed from HQ MAC centers a decision support system at its destination which is comprised of processors, graphics terminals, high-resolution laser displays, printers, and a data base management system.

GDSS is operational and currently tracking MAC's critical global resources. We plan to intergrate the MAC C^2 Information Processing System [MAC C^2 IPS] program with GDSS to incorporate the wing level echelon into MAC's overall command and control system. Together, these systems will propel MAC to the forefront of modern command and control technology and are a significant force multiplier to MAC's critical war-fighting capabilities.

CONCLUSION

Military Airlift Command supports our nation's objectives around the world. However, our future requires a greater emphasis on the programs I have outlined that increase the quality of life for our people and modernize our airlift and SOF forces. Our plans to meet the future challenges are sound. We need your continued support for these programs so that MAC will continue to be the backbone of deterrence.

Senator **KENNEDY**. Very, very good. Thank you.

Senators, let me say that we thought we would hear from the whole panel, and following that, would go to our questions.

Following that procedure, I would ask Admiral Metcalf to proceed with his statement.

STATEMENT OF VICE ADM. JOSEPH METCALF III, USN, DEPUTY CHIEF OF NAVAL OPERATIONS FOR SURFACE WARFARE

Admiral **METCALF**. Mr. Chairman, distinguished Senators, I am Vice Adm. Joseph Metcalf III. I am the Deputy Chief of Naval Operations for Surface Warfare and the sponsor of the SCN Program, including amphibious forces.

I am delighted to be here today. I would like to have my formal statement entered into the record.

Senator **KENNEDY**. All of the statements will be included in the record as if read.

Admiral **METCALF**. I would like to second the superb remarks that General Cassidy had to say about people. We are affected in spades in the Navy, when you figure that about 10,000 sailors today are eyeball to eyeball at sea with the Soviet Union. There families are at home.

I was also reminded when you introduced me in your opening statement and you said that I have been in the Navy for 31 years. I would like the record to show that I joined in 1946, in Springfield, MA. I wanted to really get that sorted out.

Senator **KENNEDY**. I knew we were going to get along. [General laughter.]

Now, if you have relatives up there——

[General laughter.]

Admiral **METCALF**. I just thought I would remind you of that, Senator. [General laughter.]

As the General was talking, I remembered that as a commissioned officer, I have spent 15 years at sea. So I understand perfectly well, from personal experience, what it is all about.

But on to amphibious warfare. I guess I ought to correct something else.

My statement has something to say about how the Marine Corps invented amphibious warfare in World War II. Actually, 201 years ago, the Navy and the Marine Corps were evacuating New Providence Island in the Bahamas, so amphibious warfare is something which the Navy and Marine Corps are very good at. We know how to do it. At the present time, we are putting together a force which will be second to none, the best we have ever fielded.

Let's talk a little bit about the specific program.

The amphibious program is designed around the maritime strategy.

We actually set our MAF and our MAB requirements before we perfected the maritime strategy. What we have done is to mold this, recognizing the fiscal constraints. We think we have an amphibious lift, forcible entry projection strategy which makes sense.

We have concluded that we have to increase our amphibious lift, and we are doing that. We have to improve our ship to shore capability through a procurement of LCACs and the Osprey and the CH–53. We are doing that.

We have some deficiencies in systems and equipment to support amphibious operations, and we are working on that problem.

The maritime prepositioning force, the MPF operations, which Admiral Piotti will discuss in some detail, are employed with a Marine Amphibious Brigade, and we consider them part of amphibious warfare.

However, the MPF is not capable of forcible entry, which is the mission for our amphibious forces.

Now, to understand amphibious lift is to understand and recognize it as part of the 600 ship Navy. The primary factors in determining amphibious ship designs and objective are the Marine Corps lift requirement and the ship to shore assets required to execute landings to meet those requirements.

The stated goal for 1996 is a capability to lift the assault echelons of both a Marine Amphibious Force and a Marine Amphibious Brigade. The assault echelon includes the fighters, which are the critical elements needed to seize a beachhead and rapidly build up combat power ashore.

So, the assault echelon is transported, landed and supported with the specialized amphibious ships.

The follow-on landing forces are embarked in the Military Sealift Command shipping. Military Sealift controlled ships would include both Government-owned vessels and those chartered or requisitioned from the private sector.

The amphibious force consists of 63 ships at the end of 1987. These ships will provide us with a capability of landing over 40,000 troops, 423 CH–46 helicopter equivalents, and 1.7 million cubic feet of cargo, over 800,000 square feet of vehicles, 40 LCACs, 10 LCUs and 55 LCMs.

Lift shortfalls are primarily in the area of helicopter spots and cube carrying capacity.

The 5-year shipbuilding program is designed to alleviate these shortfalls and increase our amphibious force to a total of approximately 74 ships in 1996.

Mr. Chairman, this concludes my summary of my presentation on amphibious forces. I'd be pleased to answer any questions.

[The prepared statement of Admiral Metcalf follows:]

PREPARED STATEMENT OF ADM. JOSEPH METCALF III, USN, DEPUTY CHIEF OF NAVAL OPERATIONS FOR SURFACE WARFARE

Mr. Chairman and members of the committee, I am Vice Admiral Joseph Metcalf III, USN, the Deputy Chief of Naval Operations for Surface Warfare and the Amphibious Force Sponsor. I am pleased to have the opportunity today to present to you the Amphibious Lift portion of this hearing.

Amphibious Warfare is a unique capability developed and perfected jointly with the U.S. Marine Corps during World War II. It employs forces uniquely fashioned for forceable entry—there is nothing defensive about Amphibious Warfare. Amphibious operations in combat epitomize the strong heritage of the Marine Corps, and the Navy is proud to be a part of this vital concept. I intend to emphasize our continued support of this offensive mission as an essential part of our Maritime Strategy. I will now provide you with some details which will give you a better view of specific Navy programs which support our Amphibious Warfare mission.

In developing plans to expand the Navy and seeking to revitalize our maritime strength we quickly concluded that we must increase our amphibious lift, improve our ship to shore capability through procurement of LCAC, MV-22 OSPREY and CH-53E and correct deficiencies in systems and equipment which support amphibious operations. Our initiatives are far ranging and designed to achieve a balanced increase in tactical air, naval surface fire support, amphibious forces, CH-53E helicopters, assault craft, sealift, prepositioning, cargo handling and off-loading equipment, and general increases in ordnance and supplies.

The first area I wish to discuss is Maritime Prepositioning Force [MPF] Operations. This capability is a strategic deployment option consisting of equipment and supplies for a Marine Amphibious Brigade [MAB] prepositioned aboard forward deployed Maritime Prepositioning Ships [MPS] and a MAB that is flown into an objective area to assemble with its equipment for the conduct of subsequent combat operations. This capability is global in nature, naval in character, and suitable for employment in a variety of circumstances. It provides an essential element in the conduct of both the national and maritme strategy of the nation. The MPF provides the fleet commander deployment flexibility and increases the capability to rapidly respond to crises with a credible force. Furthermore, the forward positioning of the MPS is an inextricable element of global naval presence in peacetime and a means for response during times of crisis. The MPF, however, is not capable of forceable entry—this mission is left to our Amphibious Forces. I would now like to address the current status of amphibious lift.

Amphibious lift is an essential element of the "600 ship Navy." Although a host of factors are taken into account in determining total force requirements, the primary factors in determining the Amphibious Force level and ship design is the Marine Corps lift requirement and the ship to shore assets required to execute the landings. The stated goal for 1996 is the capability to lift the assault echelons of both a Marine Amphibous Force [MAF] and a Marine Amphibious Brigade [MAB]. The Assualt Echelon [AE] is composed of the most critical assault elements needed to seize a beachhead and rapidly build up combat power ashore. These elements must be transported, landed, and supported from specialized amphibious ships in order to successfully conduct an amphibious assault. The remainder of the landing force makes up the Assault Follow-on Echelon [AFOE], comprising the troops, equipment and supplies needed to support and sustain the initial assault. These follow-on landing force elements are embarked in Military Sealift Command [MSC] controlled fleet ships, which may be government-owned and chartered or requisitioned from the private sector.

Generally speaking, the Assault Echelon contains about 75 percent of the personnel, a little more than half the vehicles, 20 percent of the dry cargo and supplies, and 10 percent of the POL. This leaves 25 percent of the personnel, a little less than half the vehicles, 80 percent of the dry cargo and supplies, and 90 percent of the POL to be lifted in the AFOE ships.

The Marine Corps has defined and stabilized the equipment and troops that go into making up the assault echelons of a MAF and MAB through the 1990's. This lift requirement equates to 50,000 personnel which includes the associated Naval Support Elements, 633 CH-46 equivalent helicopter spots, 2.5 million cubic feet of combat cargo and 1.1 million square feet of combat and support vehicles (Table 1). Two other factors must be taken into account in the design of our ships. The first is the amount of well deck space required to lift the boating assets that are necessary to execute the surface portion of the ship to shore movement. Well deck space to lift

90 Landing Craft Air Cushion [LCAC] Vehicles, 12 LCUs and 54 LCM 8s is needed to support the Assault Echelon of a MAF and a MAB. The second is the number of flight deck spots required to support the air portion of the ship to shore movement. A total of 96 CH-53s, 225 V-22 Ospreys, 60 AH-1s, 60 UH-1s, 13 MH-53Es and 6 CH-46s are required to support the Assault Echelons of a MAF and MAB. This mix of helicopters equates approximately to 633 CH-46 equivalents.

1996 ASSAULT ECHELON LIFT REQUIREMENT

	TROOPS	VEHICLE (SQ FT X 1000)	CARGO (CU FT X 1000)	HELO (CH-46 EQUIV)	LCAC/LCU/LCM 8
MAF (AE) + NSE	37800	784	1793	467	66/8/38
MAB (AE) + NSE	12200	293	697	166	24/4/16
TOTAL	50000	1077	2490	633	90/12/54

TABLE 1

The amphibious force will consist of 63 ships at the end of fiscal year 1987. This excludes the two AGFs which are converted LPDs and designated to support Fleet Commander flagship requirements. These 63 ships provide us a capability to lift approximately 40,860 troops, 423 CH-46 equivalent helicopters, 1.7 million cubic feet for cargo, 846 thousand square feet for vehicles, and the well deck space to lift 40 LCACs, 10 LCUs and 55 LCM-8s (Table 2). Lift shortfalls are primarily helicopter spots and cargo cube capacity.

1987 AMPHIBIOUS SHIP LIFT CAPACITY

TROOPS	VEHICLE (SQ FT X 1000)	CARGO (CU FT X 1000)	HELOS (CH-46 EQUIV)	LCAC/LCU/LCM 8
40860 (82%)*	846 (78%)*	1723 (69%)*	423 (66%)*	40/10/55 (44%)(83%)(101%)*

* % OF 1996 ASSAULT ECHELON LIFT REQUIREMENT

TABLE 2

The 5-year shipbuilding program is designed to alleviate these shortfalls and increase our amphibious force to a total of approximately 74 ships by 1996. (See Table 3—Amphibious Force 1986-1996). A comparison of Table 1 and Table 4 shows that the lift capacity of these 74 ships will come extremely close to meeting the Marine Corps lift requirements by 1996. We are currently examining other means such as delaying certain ship retirements by one year to come even closer to our goal.

AMPHIBIOUS FORCE

1986 - 1996

	86					FY						END	
CLASS	INV	87	88	89	90	91	92	93	94	95	96	INV	CLASS
LHA 1	5											5	LHA
LPD 1*	2											2	LPD 1
LPD 4*	11											11	LPD 4
LPH 2	7										-1	6	LPH
LKA 113	5											5	LKA
LSD 28	3				-3							0	LSD 28
LSD 36	5											5	LSD 36
LST 1179	20											20	LST
LCC 19	2											2	LCC
LHD	0			+1			+1	+1	+1		+1	5	LHD
LSD 41	2	+1	+1	+2	+2							8	LSD 41
LSD 41(CV)	0							+1	+1	+1	+2	5	LSD(CV)
TOTAL	62	63	64	67	66	66	67	69	71	72	74	74	

* SHIP TOTALS DO NOT INCLUDE USS LA SALLE (AGF 3), COMIDEASTFOR FLAGSHIP, AND USS CORONADO (AGF 11); REFLECTS JANUARY 87 FYDP

TABLE 3

1996 AMPHIBIOUS SHIP LIFT CAPACITY

TROOPS	VEHICLE (SQ FT X 1000)	CARGO (CU FT X 1000)	HELO (CH-46 EQUIV)	LCAC/LCU/LCM 8
53161	1086	2451	627	85 / 12 / 5
(106%)	(100.8%)	(98.4%)	(98.7%)	(95%) (83%) (101%)

TABLE 4

The trend to building more capable ships is reflected in our selection of the LHD 1 Class ship which is a modification of our largest existing class, the LHA. Design changes from the LHA include the ability to carry three rather than one LCAC and improved Aviation Intermediate Maintenance facilities that will support a detachment of four to six AV-8B vertical/short take-off and landing aircraft as well as helicopters. In addition to her primary mission of amphibious assault, the LHD can perform a secondary mission of force projection and sea control. As an example, by the use of maintenance vans and packup kits, aviation support facilities could be expanded to handle twenty AV-8Bs for contingency sea control operations.

Congress has fully funded two LHD 1 *(Wasp)* class Amphibious Assault ships to date. Last year, $35 million was appropriated for long lead material for follow on units of the class.

The fiscal year 1988 request includes $740.7 million for construction of one LHD 1 in fiscal year 1988 and $32.2 million for advance procurement for the fiscal year 1989 program. The fiscal year 1989 request includes full funding of $741.1 million for another ship. The long lead funds are for procurement of priced options for main propulsions and auxiliary machinery.

Last year LSD 42, the second of the *Whidbey Island* dock landing ships, was delivered. A total of eight ships of this class have been funded. This year we are requesting $324.2 million to fund one LSD 41 (Cargo Variant). This ship will transport and launch amphibious craft and vehicles with their crews and embarked personnel in amphibious assault operations. It will also provide limited docking and repair services for conventional landing craft and LCAC. The ship will differ from the original LSD 41 in that it will have additional cargo capacity, but carry two fewer LCAC. This ship will help correct the cargo cube shortfall that will exist in the 1990's. In the long term it is envisioned that later ships of the class may ultimately replace the LKA. The LSD 41(CV) will carry 2 LCACs and 40,000 cubic feet of cargo (vice 4 LCACs and only 5,000 cubic feet of cargo in the baseline LSD 41).

Increasing our lift capability is only part of the solution needed to improve our forceable entry posture. The helicopter was introduced into the Amphibious Force in 1958, giving it the capability to launch troops and air transportable equipment from a standoff distance. However, the surface assault and movement ashore of tanks and heavy equipment by slow, conventional landing craft continued to require the Amphibious Task Force to remain close to the shore.

Both the increased risk to our forces and modern technology have brought us to the use of air cushion craft to complement the helicopter. The LCAC is the key to our concept of operations in the 1990s and beyond. That concept envisions conducting the assault from 25 to 50 miles offshore using both LCAC and helicopters as compared to our present capability which requires the launch of the surface assault within one to five miles from shore.

The importance of the LCAC in improving our tactical choices against hostile shores cannot be over-emphasized. Future amphibious assaults will capitalize on the speed of the Amphibious Task Force and the 40 knot plus speed of the LCACs and helicopters to deny disclosure to the enemy and prevent positioning of his anti-assault forces. A modern Amphibious Task Force can be nearly 500 miles away from the objective at H-Hour minus 24 and make a pre-dawn attack launched beyond the enemy's horizon.

The LCAC also provides a four-fold increase in beach areas accessible to our Amphibious Forces because it is not restricted by tides, beach gradients and surf conditions. The mere presence of air cushion vehicles in the Amphibious Task Force greatly complicates the enemy's efforts to mass an adequate force to repel the assault by increasing the number of potential landing sites or the expanse of shoreline he must be prepared to defend. The air cushion capability also allows the LCAC to proceed inland to discharge its cargo on dry trafficable terrain, thus avoiding the significant buildup of troops, equipment and material at the surf zone which is characteristic when using conventional landing craft. Additionally, the overall survivability of the Amphibious Task Force is enhanced during the initial assault through the ability to keep the ships over-the-horizon at longer ranges and to disperse them as necessary, thereby lessening the enemy's ability to predict where to employ mines and construct elaborate beach defenses. The LCAC also increases the survivability of the landing force by permitting a more rapid buildup of combat ashore and in places least expected.

The fiscal year 1988 LCAC request includes $43.7 million for advance procurement of long lead materials for the fiscal year 1989 program. Advance procurement is required to minimize the effect of production line breaks for craft components such as engine and transmission assemblies, and to maintain craft delivery schedules necessary to meet our amphibious lift requirements. The fiscal year 1989 request includes full funding for nine LCACs and advance procurement in support of the fiscal year 1990 program (12 craft).

The Amphibious Fleet Modernization Program (FMP) provides for incremental improvements to our amphibious ships and emphasizes ship survivability and amphibious mission enhancement. Firefighting improvements both on the flight deck and in the main machinery spaces are being accomplished. All facets of aviation support are being addressed on the LHAs and LPHs including improved landing aids and aviation ordnance handling capabilities. Modifications in support of the introduction of the LCAC are being accomplished on our welldeck ships. Major improvements to our cargo handling and offload systems are also being vigorously addressed to support the sustainment of our amphibious forces.

Mr. Chairman, this concludes my presentation of the Amphibious Forces. I am pleased to have had the opportunity to appear before your committee and I stand ready for your questions.

Senator KENNEDY. Thank you very much.

Admiral Piotti, might I mention that I understand you are a graduate of the Massachusetts Marine Maritime Institute, were you not?

Admiral PIOTTI. Yes, and I still have several relatives up in the Massachusetts area. [General laughter.]

Senator KENNEDY. We don't have many members from Massachusetts on this committee.

Admiral METCALF. It's quality.

Senator KENNEDY. Admiral, that is a wonderful training center. For years, my family has been down on Cape Cod, and I am very familiar with all the personnel who run it and the people who were admitted to it. It had, and still has, a very proud commitment to maritime training and we are delighted to have you here.

STATEMENT OF VICE ADM. WALTER T. PIOTTI, JR., USN, COMMANDER, MILITARY SEALIFT COMMAND

Admiral PIOTTI. Thank you, Mr. Chairman.

I, like my two colleagues, welcome the opportunity to participate in this hearing because sealift is a little known field, and one which the Navy has devoted significant interest to and assets against over the past 5 years and for the foreseeable future.

As you are aware, in March 1984, the Navy formalized strategic sealift as one of its three distinct functions by adding it to its long-standing traditional roles of sea control and power projection, amphibious warfare being a segment of the function about which you have just heard from Admiral Metcalf.

The goal of strategic sealift is the reduction of initial unit deployment times and the removal of any impediment to providing required initial and sustaining logistics at the earliest possible time in support of the national strategy.

The Military Sealift Command, under the Secretary of the Navy, is charged as the single manager operating agency for ocean transportation, or sealift, within the Department of Defense.

As such, the Commander, Military Sealift Command is charged with the movement of materials and supplies for our Armed Forces and other Government agencies in both peace and war.

MSC is a worldwide organization, which, in peacetime, employs some 8,000 military and civilian employees and contract mariners. Our active fleet of 121 Navy-owned or chartered ships is manned by civilian mariners and is engaged around the world on a daily basis in primarily three functions: direct fleet support; special mission support; and strategic sealift.

It is strategic sealift that is of primary concern to the members of the committee and on which I will focus today.

We must be ever-prepared to meet all of our contingencies: to repel attacks on our freedom from any foe, in any part of the world at any time. Such a capability, since the beginning of our history, has required a capacity to deploy and sustain military forces whenever and wherever needed as rapidly and for as long as operational requirements dictate.

The success of that sealift contingency mission is ever-dependent on the capacity and capability of the U.S. merchant marine to respond with the necessary men and ships.

Forty years ago, the United States had the strongest maritime fleet in the world—about 5,000 ships. Today, that fleet numbers less than 500, and about 20 percent of those are inactive.

This projects a military shortfall out through the 1990 period of about 100,000 short tons of dry cargo lift and a shortfall of 20 to 30 tankers again by 1990.

Further, we face a projected initial maritime personnel shortage of about 6,200 and a sustaining personnel shortfall of more than 8,100 trained mariners to meet the strategic sealift requirements.

What are we doing about it?

Let me assure you that much has been done and much more is being done. The Navy's budgets for the last 6 years have included significantly more money for strategic sealift than in all previous budgets going back to World War II put together.

The principal program we have undertaken to meet this sealift shortfall is the Ready Reserve Force. In 1983, prior to the time sealift became one of our three missions, we had zero ships in the procurement program. Today, we have 82.

This fleet of inactive general cargo ships, barge carriers, roll-on/roll-off ships, crane ships and tankers now numbers 82 and will grow to a program strength of 122 by 1992.

These ships can be selectively activated in 5, 10, or 20 days.

Additionally, we have had to construct or convert and subsequently deploy three squadrons of Maritime Prepositioning Ships to locations at Diego Garcia, the Eastern Atlantic and the Guam-Tinian area. Each squadron of four to five ships carries enough equipment and supplies to support a full Marine amphibious brigade of 16,500 men for a 30 day period.

We also have chartered and prepositioned 12 ships at Diego Garcia, landed with Army and Air Force equipment, supplies and fuel to provide us an edge as far as surge lift in that area of the world. We have bought and converted eight large container ships into Fast Sealift Ships. These ships, at 946 feet long, are capable of traveling at greater than 30 knots and providing us the capability of moving an entire mechanized division quickly to distant trouble spots.

We have acquired five new T-5 tankers, two hospital ships, two aviation support ships, and three auxiliary crane ships. This latter force will expand to 12 ships by the end of the decade.

In addition, we have devoted significant resources to our sealift enhancement program. The program provides improved merchant ship capabilities to conduct strategic sealift and, among other things, to deliver cargo at unimproved beaches or in areas where cargo-handling infrastructures have been destroyed, damaged, or have not previously existed.

To address the projected contingency manpower shortage, the Departments of the Navy and Transportation have studied the establishment of a maritime reserve program. To sustain our forward military strategy and strategic mobility in time of war, the Navy's strategic sealift programs will have pumped billions of dollars into the maritime economy by the end of this decade.

Forty of our 42 allies are overseas. Furthermore, the world has grown smaller and potential foes far more capable of quick and deadly attack than in the past. We cannot afford the luxury of thinking we are going to have the opportunity of a catchup period in the event of a serious contingency.

Thus, sealift is absolutely essential to the success of our military strategy and an absolutely critical component of this Nation's security.

This fact is fully recognized by the Department of Defense and the U.S. Navy, and we are proceeding at full speed to meet the Nation's needs in this critical area.

I, like my colleagues, will be glad to answer any questions you may have in the area of sealift.

[The prepared statement of Admiral Piotti follows:]

PREPARED STATEMENT OF VICE ADM. WALTER T. PIOTTI, JR., USN, COMMANDER, MILITARY SEALIFT COMMAND

Mr. Chairman, members of the Subcommittee on Projection Forces and Regional Defense of the Senate Armed Services Committee, I thank you for the opportunity to participate in this hearing.

It is my wish that I will be able to detail the importance of strategic sealift to the national strategy in peace and in war and to reflect the importance the Department of Defense has placed on this most vital component of the Nation's defense.

In March 1984, the Navy formalized strategic sealift as one of its three distinct functions by adding it to its longstanding traditional roles of sea control and power projection. The goal of strategic sealift is the reduction of initial unit deployment times and the removal of any impediment to providing required sustaining logistics at the earliest possible time.

The Military Sealift Command, under the Secretary of the Navy, is the executive Director for the single Manager Operating Agency For Ocean Transportation [SEALIFT] within the Department of Defense. As such, MSC is charged with the movement of materiel and supplies for our Armed Forces and other Government agencies in peace and war. In both cases, the U.S. maritime industry is an absolutely indispensable adjunct to our national defense activities.

MSC is a worldwide Navy command which in peacetime employs some 8,000 military and civilian employees and contract mariners. Our active fleet of 121 Navy-owned or chartered ships is manned by civilian mariners and is engaged around the world on a daily basis in primarily three functions:

Direct Fleet Support—MSC's Naval Fleet Auxiliary Force of 36 ships provides fuel, ammo, food, supplies, spare parts, towing services and ocean surveillance to at-sea Navy combatants.

Special Mission Force—22 ocean survey, research, cable and other ships which support a variety of worldwide Navy operations.

Strategic Sealift—63 ships, which are point-to-point carriers and are employed to satisfy the ocean transportation requirements of the Government.

It is Strategic Sealift that is of primary concern to the members of this subcommittee, and that portion of the MSC responsibility I will focus on in this testimony.

Today we are well on our way to having in place the 600-ship Navy, and our Armed Forces are more alert, better trained, and more ready to respond to contingencies than at any time in the recent past. This is as it should be, for as you well know, today's world is far more hostile and certainly more threatening than it has been in the past.

For this reason we must be ever prepared to meet all contingencies, to repel attacks on our freedom from any foe, in any part of the world, at any time.

However, such capability requires a capacity to deploy and sustain military forces whenever and wherever needed—as rapidly and for as long as operational requirements dictate.

The success of that sealift contingency mission is ever dependent on the capacity and capability of the U.S. merchant marine to respond with the necessary men and ships. Thus, the partnership between MSC and the merchant marine remains a vital element to this nation's capacity to respond to any emergency.

It is important to note that 95 percent of all dry cargo and 99 percent of all fuel needed to support our military strategy must be delivered by ship. There is simply no other practical way to do it. A global war situation calls for MSC to direct operation of more than 700 ships and management of over 1,600 ships—95 percent commercially owned and all civilian manned.

Forty-five years ago, our merchant marine was in its ascendency, the result of an ambitious merchant shipbuilding program triggered by World War II.

Today our merchant marine—ships and seafarers—is in an accelerated rate of decline. Forty years ago, the United States had the strongest maritime fleet in the world—about 5,000 ships. Today we have less than 500, and about 20 percent of those are laid up. For the first time in our history, our combatant fleet outnumbers our merchant marine fleet.

This alarming condition of our fleet projects to a military shortfall which could reach ½ million deadweight tons by 1990. In the area of tankers—a commodity vital to our military in an emergency—the Navy shortfall is in part addressed by the procurement of 20 ships.

Further, a joint study concluded by the Navy and Maritime Administration [MaRAd] last August reflects a projected initial maritime personnel shortage of about 6,200 and a sustaining personnel shortfall of more than 8,100 trained mariners to meet strategic sealift contingency requirements.

A number of factors have played a role in this decline: an excess of tonnage worldwide, a reduction in world transportation demand, higher U.S. capitalization costs and operating costs, to mention a few.

Add to this, the trend in recent years to increased containerization of cargo and building of ever-larger ships. While these ships may be commercially successful, they have serious military drawbacks. The larger ships cannot gain access to some ports. Much of our military cargo simply cannot be containerized and shoreside container facilities may not be available during hostilities. The traditional "breakbulk" ships, which in the past were our military lifeblood, are being phased out of commercial operation as too expensive to operate. So, we are not only seeing a decline in the number of U.S.-flag merchant ships and crews—we are also having to deal with a pronounced shift toward ships that are less militarily useful.

This, then, is the scenario and the obvious question is, "What are we doing about it?" Let me assure you that much has been done and much more is being done to bring the Nation's Sealift capability up to necessary standards.

The Navy's budgets for the last 6 years have included significantly more money for strategic sealift than all previous budgets going back to World War II put together.

While a case may be made that strategic sealift underwent a period of neglect, such has not been the case in recent years. As I mentioned earlier, the Navy established strategic sealift as its third function in 1984, and has devoted significant resources to it.

The principal program that we have undertaken to meet sealift shortfalls is the ready reserve force. This fleet of inactive ships is principally made up of older general cargo, barge carriers and RO/ROS no longer able to economically compete in commercial trade. It currently consists of 82 ships, programmed to grow to 122 by 1992. These ships are kept in a state of near-readiness and can be selectively activated in 5, 10, or 20 days.

The acquisition of this fleet of 122 ships will total more than $570 million. Subsequent to acquisition, additional monies are spent on upgrading, maintenance, and repair as well as for hands-on training in exercises worldwide.

Additionally, we have deployed three squadrons of maritime prepositioning ships to Diego Garcia, the Eastern Atlantic and the Guam-Tinian area. Each squadron of four or five ships carries enough equipment and supplies to support a full marine amphibious brigade of 16,500 men for 30 days.

These ships have been specially constructed or modified for this mission. Each ship carries a spread-load cargo of food, water, oil, ammo, and supplies.

Before obtaining these dedicated, long-term ships, we acquired through charter other cargo vessels. Twelve of these vessels are deployed to Diego Garcia and carry Army and Air Force supplies. Thus, our total forward prepositioned assets number 25 ships.

We also bought and converted eight large container ships into what are called fast sealift ships. They are big—at 946 feet almost as long as an aircraft carrier—

and can travel in excess of 30 knots. They allow us to move an entire mechanized division quickly to distant trouble spots. These ships are maintained in reduced operating status, capable of being brought on berth in 4 days.

In addition we have acquired five new T-54 class tankers.

We also have added two hospital ships, two aviation support ships and three auxiliary crane ships to our sealift fleet. The latter, programmed to grow to a fleet of 12, are designed to discharge non-self sustaining container ships that make up most of the U.S.-flag active fleet.

In additon, we have devoted significant resources to our Sealift Enhancement Program which improves merchant ship capabilities to conduct strategic sealift and to augment direct fleet support ships and to deliver cargo at unimproved beaches or in areas where the cargo handling infrastructure has been damaged or destroyed or had not previously existed.

To address the projected contingency manpower shortage, the Departments of Navy and Transportation are studying the establishment of a Maritime Reserve Program made up of former experience mariners.

I want the distinguished members of this subcommittee to keep in mind that these programs, designed to help offset the shortfall in available merchant ships and manpower, are not designed as a final solution. Far from that. We need to address the broad problem of a viable merchant marine industry and national defense to meet our wartime shipping requirements. Toward that end Congress had directed the establishment of a Commission on Merchant Marine and Defense, which has begun to look for solutions that will answer joint commercial and defense needs.

As you can see, to sustain our forward military strategy and strategic mobility in time of war, the Navy's Strategic Sealift Programs will have pumped billions of dollars into the maritime economy by the end of this decade. At least eight different U.S. shipyards will share in ship construction and conversion, as will scores of component manufacturers and shipyard suppliers. Most other U.S. shipyards share in the repair and maintenance of our sealift assets.

The successful deployment and support of forces in executing military strategy in both war and peace depend heavily on strategic sealift. Increasing emphasis on mobility, force readiness and response, coupled with the precipitous decline of the U.S.-flag merchant fleet, has brought all aspects of strategic sealift into sharp focus.

Forty of our 42 allies are overseas. Furthermore, the world has grown smaller and potential foes far more capable of quick and deadly attack than in the past. We cannot afford the luxury of thinking we will have the opportunity of a catch-up period in the event of a serious contingency.

Thus, sealift is absolutely essential to the success of our military strategy and an absolutely critical component of this nation's security.

This fact is fully recognized by the Department of Defense and the U.S. Navy and we are proceeding at full speed to meet the nation's needs in this critical area.

Senator KENNEDY. Thank you very much, Admiral.

We will follow the 10-minute rule for our questions.

Let me just commend all of you for your full and complete testimony. I found it very valuable and very relevant to what I think our committee is most concerned about. I think your summaries have been excellent.

I think that one of the things that we find running through all of the testimony is the very strong recognition of the need for good, quality, trained, highly motivated personnel. This is something that I think deserves special attention. As a member of this committee, I think all of us are very mindful that, when the belt-tightening finally occurs, it is too often focused on cutting back those resources that make a critical difference in terms of the personnel in our Armed Forces.

I see that General Cassidy in his testimony talked about the retention of pilots, where the cumulative continuation rate has declined from 79 percent in 1983 to a projected rate of 40 percent this year.

There has been a steady decline in the pay for various personnel, particularly for pilots. Aviation career incentive pay has not been increased since 1981. The other programs that you mentioned, moving expenses, the various medical services, dental care, employment for the wives of personnel so that we can give them some preferential treatment when they move around various bases. You know, the fact is many of the personnel are moving so frequently, and they are themselves paying a good deal of their moving expenses out of their own pockets. There are anomalies in pay, for sea duty. I heard in my brief conversations on the *Teddy Roosevelt* recently that many of the people at sea were being short-changed.

There is a whole range of different items here which cannot have any effect other than putting extraordinary pressure on our personnel to look for other careers, even as courageous and as committed as they are to our respective services.

I have seen the extraordinary increase in the quality of the personnel that we have in our Armed Forces, but we are beginning to get some very important danger signals. It will be enormously costly in terms of our security interests and costly in other ways unless we learn the lessons of the past well—where we have not accorded high priority to these areas, we have paid a very, very substantial price for it.

The information that you gave to us in these areas I am very hopeful our subcommittee will recognize and our full committee will, as well. I want to give you assurances that we are going to continue to follow up on those issues. I will and I am sure other members of the committee will. Hopefully the Congress will. We want to continue to be informed about what is happening in those areas.

I think that this is an enormously important aspect.

Mr. Chairman, we were discussing the very strong emphasis that the panel was making in terms of the personnel challenges—retention, in terms of pilots and other personnel and the whole range of different personnel challenges. I think each member of the panel commented on those matters in a very convincing, compelling way. I just said that this is something which our subcommittee and our full committee will visit.

It seems to me, as you read through all of the testimony, it has focused on the extremely important area of airlift and sealift capability, and this is something that I am hopeful that we will be responsive to in this committee.

C–17

General Cassidy, let's focus on the C–17. I am sure there will be discussion in this subcommittee as well as in the full committee and probably on the floor about where we are going, as we try to look at every possibility for cost savings. We are trying to find out what the real implication would be of deferral of C–17 procurement for 2 years until 1990.

You may be familiar with the conclusions of the CBO, which calculates a 5-year saving from such a deferral at $4.9 billion.

What can you tell us of the considerations involved in the deferring of the production for 1 or 2 years? How significant would that be in terms of national security? Would you address the whole issue, please?

General **Cassidy**. Yes, Senator. I would be glad to do that.

May I preface my remarks by saying just your understanding and sensitivity to our people issues are very heartening to me, and I will be glad to pass that on to our people as I see them; that you do have a full understanding of some of the problems that they face.

With regard to the C-17 and delaying it, I use a comment occasionally, as I am talking to audiences about the C-17, that somehow we very cleverly compressed a 12-year program into 18 years already, and if we find ourselves stretching or delaying that program any further, we almost price ourselves out of business.

I assume, as I have seen and dealt with the Members of the Congress, specifically this committee, that we will build the airplane. So my thrust to you would be that we really need to get on it and build it. Had we made the decision several years ago, I would be flying that airplane today. That was our first IOC date, 1987.

So, there are two issues to deal with. One is what it will cost us. I can give you some feel for that.

I think for every year of delay, the program will cost us abut $1.5 billion. Those are not specific numbers. Obviously, we can get more specific numbers for you. But we have seen that the cost to delay the program would be about $1 billion a year.

This program also is very unique in the type of program it is because if you delay the program in its up-front portions—and that is right now, because we are getting into building the first two airplanes now—you really have a debilitating effect on the program because of the relative differences between test airplanes and production airplanes.

Unlike almost all other programs, the test airplanes in this program are production airplanes. So, if you delay production, you delay the testing and then you delay everything from that on down to IOC. The delay of production by 1 year would change my IOC on the program by at least 15 months. So we are talking now, instead of a 1992 IOC, of a 1994 one at least.

So, we would have those sorts of delays in delivering first airplanes as well as some very significant financial costs with that.

But, all that aside, I think my best comments to the committee would be representing the other CINCs whom I support. In whatever contingency, peacetime or wartime, I find myself as a supporting CINC, that is, supporting someone else. Without question and without doubt, as I talk to each one of these CINCs, be it CINCEUR, CINCCENT, CINCSO, CINCPAC, CINCLANT, they come on very, very strongly, and I believe they have in testimony to this Congress that they need the airplane now. They do not need it delayed.

We need to build the airplane and get on with it because they have shortfalls now. They do not have predicted shortfalls. They have shortfalls that exist right now.

Senator **Kennedy**. How would you respond to this? We have already increased the airlift capacity by 70 percent, from 28 to 49 MTM, over the last 5 years. Haven't we made substantial progress already in addressing our airlift needs? Second, there is a move toward the light divisions. Does that change our requirements in terms of the 66 MTM objective that was established?

Maybe you could handle both of those.

General CASSIDY. We have made some great progress in the past, sir.

But we started out well behind.

We reside right now, at the end of fiscal year 1986, with a capability, a capacity, of 36.2 million ton-miles a day, against our goal of 66, which is, as I mentioned before, only a goal. It is not the requirement.

So, anything to slow that down, first of all, I would have to come back to the Congress and tell you that we could not meet our midterm guidance, which we have set for ourselves, and we would not be able to meet the 66 million ton-miles till at least past the year 2000, probably the year 2001 and beyond.

So we just would not be able to do what the Congressionally Mandated Mobility Study said we should do. And all of that, then, would affect all other parts of our Airlift Master Plan.

For instance, it would affect my ability to move airplanes into and modernize the Air National Guard and Air Force Reserve on time because I could not do that until the C–17 came under production.

It would affect a whole number of issues of the master airlift plan. We would just have to rewrite that.

As for the second part of your second question——

Senator KENNEDY. It dealt with the light divisions, with the change now in the structure of those Army divisions. Does that affect anything?

General CASSIDY. It does not affect the total requirement at all. The total requirement is still there.

The Army making light divisions gives us the ability to move it faster, early. But there is still the same amount of things that are in the light division.

For instance, much of what they skinnied down to make light in the division so that we could move it quicker and earlier, they moved into the combat service support arena, so that outsized and heavy equipment is still there and will have to be moved sometime.

As well as this, once you move a division in light, you have to start resupplying them. The first soldier you put in you have to start resupplying because he only goes in with enough equipment to fight between 1 and 3 days.

So, it actually increases our resupply role. And, of course, the C–17 is terribly well suited to that role.

Senator KENNEDY. Let me just ask about the bottlenecks.

If we buy the hundreds of C–17, that is one thing; obviously getting the loads onto the planes is another.

In the event of a contingency in Europe, where are our tanks today? How do we move them to the airfields where they can be lifted to Europe? Is MAC satisfied that the fast airlift can actually operate?

Have you exercised that particular thing?

General CASSIDY. Well, our exercises have shown us that we need something like the C–17, sir.

We find ourselves in bottleneck situations. The airplanes that we are operating right now, as good and wonderful as they are, were not built for mobility on the ground. The C–17 not only has the inherent flexibility and agility of being an airplane and what it can do with speed and range in the air, but it also has built into it great agility and capacity on the ground. It has maneuverability on the ground.

So we have built into that airplane an ability for throughput, something that we really had never built into an airplane before. It is an ability to load it quickly and off-load it quickly. This does a couple of things for us.

First of all, it makes it less susceptible to what happens to you on the ground—airplanes breaking or being destroyed by interdiction, et cetera. It also gives the ability to move that airplane on the ground around quickly so that you can get it back off again.

So I think there are two things to consider here. One is its ability to maneuver on the ground and its ability to be loaded and off-loaded on the ground much, much quicker than any airplane we have ever designed before. In fact, the back end of the airplane was co-designed by members of the U.S. Army, members of the Marine Corps, and the Air Force.

The source selection for the airplane was actually done in large part by the Army.

Senator KENNEDY. Have they exercised the movement of tanks and that sort of thing toward that?

General CASSIDY. We have done that. We have loaded the C-17. Obviously we have not exercised the movement of tanks on the C-17 yet. We have loaded the mockup cargo compartment of the airplane and know full well and have full confidence that we can do that.

But, we have seen what it will do to us if we cannot do that.

Senator KENNEDY. Admiral Metcalf, I will come back to you. I think I have time for just one other question.

NAVAL SHIPS

I want to talk about the changes in the requests for various Naval ships.

The Navy's earlier carrier replacement proposal calls for building the two nuclear aircraft carriers in 1990 and 1993, rather than in 1994 and 1996. This necessitates moving approximately $7 billion 3 or 4 years forward in the Navy's shipbuilding budget. The issue, then, is what programs are displaced and at what cost in terms of our budget and in terms of our security. To provide partial funding for the first of the two carriers, two ships were deleted from the fiscal year 1990 program, the DDG-51 destroyer and the LSD-41 landing ship dock. This is shown in the Navy's 5-year ship construction program, which I think you are familiar with.

I suppose, first of all, I want to know what comments you would like to make about that delay, whether or not you were asked about that, whether you supported that delay.

Admiral METCALF. Of course, primarily the money, the $7 billion, was from rearrangements in the Navy program.

The DDG-51 was deleted by the Congress when we decided to build three CG-47s instead of three DDG-51s. The Congress took one away in rearranging that program last year.

Now, the LSD-41, which is another ship——

Senator **Kennedy**. Excuse me. Just so that we are talking about the same thing. As I understand it, the posture statement that was provided for us last year provided four DDG-51s in 1990, five in 1991, and five in 1992. That was changed in the revised projection to three in 1990, five in 1991, and six in 1992. One LSD-41 was deferred from 1990 to 1991.

That is what I was basically talking about.

I don't know whether you are familiar with that alteration in terms of the Navy.

Admiral **Metcalf**. Yes, I am with you now. Essentially, what you are saying is correct. However, the adjustments were made in order to affect savings that could be achieved in our proposed two carrier buy. These ships were not deleted, but rather were delayed.

The delays in the LSD-41 and the DDG-51 programs did not create a cost penalty, outside of inflation.

In the case of the LSD, we even managed to improve matters by taking a 1-0-2-0-2 profile and making it into a 1-0-1-1-2 profile, and smoothing out the production flow.

As for the DDG adjustment, our current profile still provides for an average of five Aegis platforms a year, which represents the minimum number required to maintain effective competition.

So, I think they were on-track, on-course within a restrained program.

Senator **Kennedy**. I will come back to this. My time is up.

Senator McCain.

Senator **McCain**. Thank you, Mr. Chairman. I would like to thank the witnesses for some excellent testimony.

MILITARY PAY RAISE

General Cassidy, how much of a pay raise would you like to see next year? What percentage?

General **Cassidy**. Well, sir, I would like to see something that goes beyond just keeping up with inflation.

I cannot quantify that except to tell you that our people are pretty street-wise on that, and they realize that they just have not had a pay raise, where the private sector has.

If I could focus, say, on the aviation career incentive pay, we have lost about 27 percent of the buying power of the last raise we had, which was in 1981.

I would like to see that increased by at least 25 percent, and I could pay for a 25-percent increase in aviation career incentive pay by just retaining nine more C-141 pilots in MAC. I could pay for the whole raise.

So, I think it is cost wise to entertain that.

My only comment on the amount to you, sir, is I think it should be more than inflation.

COST OF C-5 PILOT TRAINING

Senator **McCain**. I am intrigued by the $9 million figure to train a C-5 pilot. How did you arrive at that number?

General **Cassidy**. If I could correct that, it is not $9 million, sir. I believe my statement said that it was $5.6 million for a C-5 aircraft commander. The highest figure I gave you was a little over $6 million for a C–141 aircraft commander, one of our specially trained aircraft commanders. That is one who is specially trained in special operations, low-level. Those are the sorts of pilots who are obviously our most qualified people, who operate airplanes at night, low-level, with night vision goggles on and performed blacked out landings in the very remote airstrips.

It takes quite a fellow to do that.

Senator McCAIN. Well, I would be interested in how you came up with those numbers.

General CASSIDY. I would be glad to present that to the committee, sir.

Senator McCAIN. Thank you.

[The information follows:]

C–5 PILOT TRAINING COSTS

General CASSIDY. The expenses incurred in training a pilot are varied due to the many programs they must attend and the flying hour [FH] costs associated with gaining the experience necessary to become an aircraft commander. The following are explanations of the different programs necessary to take an individual "off the street" and train him/her to the point of being an aircraft commander.

(a) Pilot Candidate Acquisition Expenses—the weighted average cost to recruit/acquire and commission an Air Force officer. The weighted average cost considers accessions from various sources, e.g., Air Force Academy, Air Force Reserve Officer Training Corp (ROTC), Officer Training School [OTS], etc.

(b) Flight Screening Program—the cost to screen a pilot candidate for flying aptitude before entering undergraduate pilot training (UPT).

(c) Undergraduate Pilot Training [UPT]—the cost to train the pilot candidate the basic flying skills.

(d) Survival Training (Basic and Water)—the cost to teach a pilot resource how to survive should he/she crash or bail out over land or water.

(e) Permanent Change of Station [PCS]—the cost to move the pilot to the primary aircraft training site or to first operational assignment, the primary weapons system being C–5, C–130, or C–141.

(f) Primary Aircraft Initial Qualification Training—the cost to train the pilot resource to fly, as a copilot, a C–5, C–130, or C–141.

(g) Pilot Annual Simulator Currency/Refresher Training—the costs associated with simulator currency/refresher training. The pilot practices emergency procedures, e.g., major systems failure, etc., in the simulator when these procedures are not practical nor possible to safely duplicate in the aircraft.

(h) Squadron Officer School [SOS]—the cost associated with this professional military training. A pilot will normally attend this course between primary aircraft initial qualification and aircraft commander certification.

(i) Pilot Experience "Aging"—the FH costs associated with the minimum FHs needed to gain primary aircraft experience before the copilot can enter aircraft commander certification training. Flying hours include only FH costs, e.g., fuel, depot maintenance, replenishment spares, base maintenance supplies. It does not include aircraft maintenance man hour costs or aircrew salaries.

(j) Mission Support Training—the cost to train the pilot in primary aircraft peculiar mission support procedures, e.g., air refueling, visual formation flying, etc.

(k) Aircraft Commander Qualification and Certification—the cost to train a copilot as an aircraft commander and certify the new aircraft commander.

When all these programs are cost factored and totaled, it is easy to see why our major weapon system (C–130, C–141, C–5) pilots cost so much to train. Specifically, a C–130 pilot costs us $1.76M to train, and the C–141 pilot is higher, at $4.03M, due to the increased complexity of the mission he/she flies. The highest cost for an aircraft commander is associated with the C–5 at $5.68 million.

The Air Force has the best trained pilots in the world, and the training is extensive and expensive, but the product is worth every cent. For this very reason, we must take positive steps to retain these pilots.

MARINE AMPHIBIOUS FORCE

Senator McCAIN. Admiral Metcalf, we have three active and one reserve Marine division wing teams. The amphibious shipping objective is only to be capable of simultaneously lifting an assault echelon of a Marine amphibious force and a Marine amphibious brigade.

How would you plan to employ the remainder of the Marine force in a major war?

Admiral METCALF. Well, in actual terms, today we can lift all of the troops and vehicles of one Marine Amphibious Force, as you are well aware, and a majority of the cargo.

Chairman NUNN. Admiral, I'm sorry, but I could not hear you.

Admiral METCALF. I'm sorry, Senator.

I say that in absolute terms, we can lift them right now, the Active Force. What the Senator is talking about is the Reserve echelon. Well, the Reserve echelon would go as a followup—not in the assault echelons, but they would go in follow-on shipping, primarily from sealift assets and perhaps from turn around amphibious shipping. That is how we would get them there. But they would not be in the assault echelon.

Senator McCAIN. So we have the capability today of lifting three active Marine divisions?

Admiral METCALF. We have the capability of lifting about 40,000 troops, a little over 40,000, or almost one MAF, Marine Amphibious Force.

Senator McCAIN. Thank you.

Given the fact that our amphibious shipping is scattered all around the world in peacetime how long would it take to assemble enough shipping to lift the assault echelon of a Marine Amphibious Force.

Admiral METCALF. The assault echelon of a Marine Amphibious Force—it would probably take us a little over a month. We would have to bring all of the troops together.

We could put a Marine Amphibious Brigade, a MAB, together whenever you want it. But the full elements of a Marine Amphibious Force would probably take us a little over a month to bring together.

Senator McCAIN. A little over a month?

Admiral METCALF. Yes, sir.

Senator McCAIN. Admiral Piotti, for several years, the Navy has been purchasing used ships, as you mentioned in your statement, in the commercial market and storing them in the Ready Reserve Force in order to increase our Nation's sealift capability.

Can Navy sealift adequately substitute for a U.S. national flag merchant marine?

Admiral PIOTTI. No, nor would we want it to.

I think our history is replete with dependence on the U.S. flag fleet and it should continue to be. So, we need a commercially viable U.S. flag fleet for economic reasons, both in peacetime and in wartime. It makes a hell of a lot more sense to the Government to have a viable merchant marine that we can count on in time of conflict to lift our strategic assets and, therefore, realize a cost avoidance, and buy the type of forces that General Cassidy and Admiral Metcalf have been talking about.

It is only because of the accelerated decline in the U.S. flag fleet that we have had to resort to growing our own force by virtue of creating a Ready Reserve Force.

Senator McCAIN. Part of our planning also entails the use of the effective U.S. Controlled Fleet, is that correct, Admiral?

Admiral PIOTTI. That is correct.

Senator McCAIN. Are these ships considered in your contingency plans for wartime sealift?

Admiral PIOTTI. Yes. In wartime, there is a phased plan by which we call on different shipping. Those Government assets that we own and operate on a daily basis, the 121 ships, are ready at any time. Of those, about 63 are sealift assets.

Again, the Ready Reserve Force is available in 5-, 10- or 20-day periods. We then would call on the U.S. flag fleet ships that are participants in the Sealift Readiness Program and that have incorporated the sealift enhancement features required. Ultimately we get down to the effective U.S. Controlled Fleet, the flag of convenience fleet and the NDRF. But that would be later on.

Our surge shipping requirement does not include the Effective U.S. Controlled Fleet.

Senator McCAIN. As you know, those ships of the U.S. control fleet are largely crewed by foreign nationals. Do you feel that they have a high degree of reliability, enough of a degree of reliability in wartime?

Admiral PIOTTI. Steering by our wake, all we can do is to take a look at what has happened in the past. We have never had a ship come where the crew has refused to sail with the ship. But, then again, those are contingencies vice a global war situation.

What we are planning on, as far as manning, is to say that probably 20 percent of those people would not come with the ships, and, therefore, we have made arrangements to insure that we have the people, through a Reserve program, to man up those spots.

Senator McCAIN. Thank you.

AIRLIFT MASTER PLAN

General Cassidy, for years, the Congress has added C–130s for the Guard and Reserve, which were not requested in the Air Force budget, as you know.

What will be the effect on the cost and military capability of your airlift Master Plan if Congress continues to add C–130s at a rate of 12 to 16 a year?

General CASSIDY. The effective cost, I would have to think that question through some more, sir. I am not so sure that I understand the question.

Senator McCAIN. No, what would be the effect on the cost and your military capability?

General CASSIDY. Well, the effect on the cost would be just what they cost. Obviously, it increases the portion of the Air Force mobility budget, which has to pay for those additional airplanes which we have had for each year.

The practical effect of what has occurred, as we have brought those airplanes into inventory, is a very good modernization of the Air Force Reserve and the Air National Guard.

As a matter of fact, there is a little dichotomy to that which some of our people cannot understand. The Air Force Reserve and the Air National Guard C–130 people are flying much more capable C–130s than the active duty people.

I harken back to when Admiral Metcalf and I went into Grenada. The active duty force that flew the first initial airplanes in there were flying much less capable airplanes than many of the Reserve and Guard units had sitting on their ramps back home.

It was just an interesting situation that has occurred.

In practicality, as the Commander in Chief of that, I cannot argue much about that. It serves us well in modernizing those Reserve Forces with brand new airplanes, which have good navigation capability and which are much, much cheaper to maintain than the older airplanes.

Senator **McCain**. It is my understanding that the C–17 will cost seven times as much per sortie as a C–130, which means, I guess, that you could generate more sorties by investing in a larger fleet of less expensive C–130s instead of a smaller fleet of more expensive C–17s.

Would you tell us why you want to fill the tactical airlift or mission with C–17s?

General **Cassidy**. I am not familiar with that figure, Senator. I would like, if I may, for the record, to give my assessment of that seven times figure.

[The information follows:]

General **Cassidy**. I was unable to validate the 7-to-1 ratio you mentioned, and normally, we don't compare the C–17 to the C–130 because it is not replacing the C–130. However, when we do compare their respective average payload-weight capability, the C–17 can carry approximately 4 times more than the C–130. Because theater payloads can be very scenario-dependent, we have chosen for simplicity's sake to compare the C–17 and C–130 in a pallet-carrying role only. The C–17 can carry 18 pallets per aircraft while the C–130 can only carry 6. The operational and support cost per hour for the C–17 is $5,168 compared to $4,426 for the C–130. Therefore, the C–17 can deliver 3 times the cargo for only a 17 percent increase in costs—a bargain in anyone's book.

Another factor that is more important than money is the threat posed to crewmembers and aircraft in a hostile environment. Because the C–17 carries 3 times as much, we would risk only 3 crewmembers and 1 airplane instead of 15 crewmembers and 3 airplanes.

Combining the facts that the C–17 is cost-effective, flies faster, will be capable of carrying outsized cargo that the C–130 isn't capable of carrying, and can be used as a strategic airlifter as well as a theater airlifter, there is no question that the C–17 is the only aircraft that answers MAC's shortfall.

General **Cassidy**. The figure that I normally use, to put it into a better perspective, quite frankly, is to compare it with a C–141. The C–17 will carry twice the load of the C–141 for the same price or less. So, I guess I would have to reconcile our figures to some degree. I am not debating yours. I just had not heard that figure used before.

My reason to want to solve as much of the tactical or theater airlift problem as I can with the C–17 is, first of all, the C–17 does it much more efficiently in that it will do it with less people.

My figures say that I carry the same load on one C–17 that I would carry on four C–130s into any given area.

That is not an analyst's view of the total capacity of the airplane. That is my view of how it is most probably going to happen as the cargo and the requirement generate somewhere in the battle plan.

So, my view of that is that I can expose three people on one C–17 to combat, rather than exposing 20 aircrew members on four C–130s to combat. Therefore, I find myself in a more advantageous position peoplewise and certainly in a relatively cheaper position airplane wise.

There are some other reasons that I intend to solve part of that, and I continue to say part of the the theater problem, with the C–17.

First of all, it is an airplane that can do both roles, and we have fairly well defined the number or the requirement for the intertheater, the strategic role, in the Congressionally Mandated Mobility Study. We have yet to define specifically or give some specific numbers to just what that requirement is in the theater role. So I have a hard time sizing the force against the number that I cannot well articulate to the Members of the Congress yet.

I find in our studies that that number can vary as much on a given day from 2,000 tons to 22,000 tons. I think you can understand that because of the varying degrees of battle and the shifting of the battle and the flexibility required of the combat commander and what he does at the battle.

Therefore, I am attempting to satisfy the strategic lift problem and still have a capacity, a capability, in that answer to the strategic problem in the theater role. So now I can do both things.

Also, with the kind of airplane that the C–17 is, if I can deliver directly to that theater commander, if I can deliver directly where he is fighting the battle, and get in as close as I can, I obviate a lot of the need for the theater airlift itself.

So, we have attacked it on several fronts, and part of the reason for that is we have not really been able to quantify specifically what you are going to need, and the reason for that is it is so scenario dependent that it is like trying to paint a moving train. You can never really get a number on it.

Senator McCain. Thank you, Mr. Chairman.

Senator Kennedy. Thank you.

Senator Shelby.

Senator Shelby. Thank you, Mr. Chairman.

GLOBAL WAR SITUATION

Admiral Piotti, on page 3 of your testimony, your written testimony, you talk about a global war situation, where it calls for the MSC to direct operation of more than 700 ships and to manage over 1,600 ships. Now 1,600 ships is a lot of ships.

How do you feel about the arrangements you are making, which Senator McCain alluded to a minute ago, concerning a lot of civilian ships and a lot of foreign carriers, and so forth. I know it is important, of course.

Admiral Piotti. What those numbers represent is the contribution made by our NATO and other allies. So in addition to the 900 or so ships we would begin with in one form or another, there is the contribution of NATO of up to 600 ships and by Southeast Asian allies of some lesser number.

Now, as regards the management of these ships we also have two Reserve components that are in being today—the Military Sealift Command component of about 3,000 people, and the Naval Control of Shipping Organization. My organization also swells by five flag officers worldwide.

We increase our number of officers from, at present, about 60 locations to well over 250 locations. This is how we manage these ships.

Now, we do not manage them in and of ourselves. They are managed together with our allies.

Senator SHELBY. What kind of management readiness do you have for this? I would assume that an undertaking of that size, which would be awesome, would need management steps.

Admiral PIOTTI. It does.

We have just completed one such readiness exercise, Wintex-Cimex, last week. We also have an annual Rainbow Reach series of exercises, in which we train both of those components, worldwide.

PERSIAN GULF

Senator SHELBY. As far as the Persian Gulf is concerned, I know you have basic contingency plans for the area, and you have some standby readiness there at Diego Garcia.

Do you feel that what you have there makes you comfortable, as far as everything else that is going on in the gulf?

Is it enough for the projected force?

Admiral PIOTTI. I cannot answer that question.

What we have in place is what is called out in the CINCs' war plan. That war plan is considered to be sufficient for the threat as viewed today. But USCINCCENT is the expert in that area, and I would ask that that question be addressed to him.

Senator SHELBY. As far as the procurement, Admiral Metcalf, of the nine LCAR craft in fiscal year 1989, you have stated how important that was and you emphasized that.

Is that going to be adequate for the Navy, the nine of these ships?

Admiral METCALF. Well, it is like anything else, Senator. It has to be balanced, but there also have to be some priorities. That represents our priority.

Senator SHELBY. That is your priority, the nine?

Admiral METCALF. Yes, that is our priority.

Senator SHELBY. So you are going to stay with the nine, and you think that will afford you, basically, considering budget constraints and everything, what you need or you can live with?

Admiral METCALF. Well, it is within the nine, and, of course, there are the building programs that go on out through the years.

We are building that force at a prudent rate.

Senator SHELBY. I believe that is all I have, Mr. Chairman.

Senator KENNEDY. Thank you.

Senator Gore.

Senator GORE. Thank you very much, Mr. Chairman.

I have just a few brief questions.

I would like to express my words of welcome to the witnesses also. I appreciate the chance to read your statements, and I am sorry I was not able to be here at the start of the hearing for your delivery.

C-17

First of all, General Cassidy, I noticed in your statement you say that in your view, the C-17 is not simply the best solution, it is the only solution.

Would you elaborate on that. Why do you believe that?

General CASSIDY. Well, sir, we have done an awful lot of study of that, as you might imagine. We have built, as I mentioned earlier, an Airlift Master Plan, where we took the requirements of the Congressionally Mandated Mobility Study or our goal—66 million ton-miles a day—took what we had today and what we had projected in the future. There are those sorts of things where we are upgrading the equipment, such as fixing the C-5 wing, stretching the C-141, buying more Civil Reserve Air Fleet airplanes, using more of the airplanes of the civil fleet. When all this is done, there is still a requirement left. There is still a great deal of requirement which we, in great military jargon, call "shortfall."

So we looked at ways to solve the shortfall. How do you do that?

You have to buy some more equipment if you have fixed everything you already have. At the same time, it is prudent to buy some more equipment because you need to modernize it because if you do not, you tie yourself to some old technologies that you are not going to be able to maintain in the future.

So, then we talk about which new airplane are we going to buy. So we started looking at that, and we designed the C-17 around the requirement. It is the first time we have ever designed an airplane around a requirement, believe it or not—a cargo, a transport airplane around the requirement. It came out looking like the C-17.

So we did not design the C-17 and then tie the requirement to it. We took the requirement and designed the airplane around it.

Senator GORE. So that is unusual?

General CASSIDY. It is unusual, it is unique, and it is wonderful to see it develop. It really is.

We also, of course, looked to other options. Do you build more old airplanes? Well, the answer to that is "no".

Do you build more bigger airplanes? Well, you need some great big airplanes. But we found out, after 17 years of operating great big airplanes, that bigger is not always better. Bigger is only better in some places.

So, there is a certain finite number of those bigger airplanes that you ought to have.

We also looked very carefully at buying some commercial airplanes that we could adapt. But, once again, we find out that the commercial airplane is designed for commercial passenger work, only for commercial passenger work. Even the commercial cargo carriers are redesigned passenger airplanes. They have problems getting in and out of small places, they take lots of runway, you have to get things up as high as 16 to 18 feet to load them, plus they just do not carry outsized equipment.

Outsized equipment are those sorts of things that right now we can only carry by the C–5 and will only be able to carry with the C–5 and the C–17 when it comes in.

So, we didn't go about it alone, just the Air Force, as I mentioned earlier. We had those people who were going to use it. Eighty-five percent of what we are going to move in wartime is the U.S. Army, and they were on board every step of the way as we designed the airplane.

That is how we arrived at the C–17. That is why I say it is really the only solution.

Even when you get down to talk about money, Senator. If you say we cannot afford the investment of the C–17 now, well, you cannot afford to buy anything else, either, because anything else that you would buy would just tie you to such a cost later on, I cannot afford to operate it.

I have to buy something that is modern.

Senator GORE. Very good. That is an impressive response.

I appreciate it.

I only have one more question.

PERSIAN GULF

We started off this year with hearings on strategy, and some of the witnesses, including Dr. Brzezinski, testified to the effect that the United States should pull a lot of troops out of NATO and use the assets thus recaptured in order to beef up our capacity for military force projection in the Persian Gulf area.

He used the figure 100,000 troops, and he envisioned in his statement a comparable investment in beefing up our ability to play a role in the Persian Gulf.

I do not agree with his suggestion. Let me make that clear for the record.

But, assuming that others did, how would such a shift fit with our current sealift capacity? Could it be handled within existing programs and those now planned, or would it require a major restructuring of what is currently in the works?

Admiral PIOTTI. Well, clearly, it is not part of the plan today. As I said, out through the end of the 5-year defense plan we will still only achieve 90 percent of the goal in terms of lift, and we will still have a shortfall in tankers.

This would exacerbate that shortfall by whatever would be the size of that footprint, that movement of troops, back to CONUS or into Southwest Asia.

I do not think that we would move them into Southwest Asia and permanently base them there the way we do in Germany. I imagine they would be positioned in CONUS. So you would have that added lift requirement.

The Indian Ocean is the long pole in the tent. This is the farthest away that we go, and it is for this reason that we have prepositioned ships at Diego Garcia.

Senator GORE. But the short answer would be that kind of shift in capabilities would require a change of comparable magnitude in the sealift command's approach in the future?

Admiral PIOTTI. It would exacerbate the shortfall, yes.

Senator GORE. All right.

Thank you very much, Mr. Chairman.

Senator KENNEDY. Thank you.

Senator Exon.

Senator EXON. Mr. Chairman, thank you very much.

Welcome gentlemen. This is a very important subject that we are working on this afternoon. I have a question or two that I would like to ask.

BUDGET CONSTRAINTS

First, General Cassidy, I would like to take you down a road that you will not want to travel. As you know, we have serious budget constraints. We are going to have to overcome the bankrupt policy.

Supposing that the Congress this year cut down the 210 C-17s that were programmed, and say, for example, we decided that all we could afford in the next few years were 100. If that would happen, I assume that would raise havoc with the shortfall and the missions for which you have responsibility.

But if that were to happen, what would be your recommendations on how we would fill the gap. Is there any option at all to buy some existing aircraft?

I flew all over the Southwest Pacific in a C-47 transport plane which was essentially a DC-3. It was not the easiest thing in the world to get a jeep and a power unit in and out of, but we managed.

I know that modifying commercial aircraft is not the most efficient way to do things. But is there a possibility that if we cut down the numbers of the C-17 total buy, that could make up the shortfall with the purchase of some other existing aircraft and have a mixed fleet?

General CASSIDY. Well, as the Senator knows, we have been down that road with you a couple of times, and I do not mind at all going down it again because I think it is responsible to keep asking ourselves those questions to make sure that we are on the right course.

As we designed the Aircraft Master Plan, we looked at that and looked at it very carefully.

First of all, if you are talking about the adaptability of commercial airplanes, we can do some of that, and we should. That adaptability should reside somewhere in the commercial fleet, because the commercial air carriers of our country are very strong, and if there is a synergy between what they fly and what we can use, then we must, in all good conscience, use that.

I think we have done that in our Civil Reserve Air Fleet. We have direct communications with them monthly in using the new equipment that they get, and we are taking full advantage of that.

So, what I am saying to you is that we have done that.

Our Airlift Master Plan assumes that we will use that kind of capacity that is coming out of the commercial world. And if we can use more, we should use more, and let it reside in the commercial world so that we can use it in wartime and will not have to pay for it in peacetime.

So I think we should continue to examine that.

Now, if in the wisdom of the Congress, we are not going to get all those airplanes or not all the money or it is going to slip, here is what my reaction simply would have to be.

I would have to start from square one and revise the Airlift Master Plan. That would affect any number of things that are inherent within that plan.

First of all, I would have to change my Reserve and Air National Guard modernization program completely. I would have to stop transferring things to the Reserve and Guard now.

I would have to go into a fairly costly program to guarantee that the airplanes I am flying now, at the rates I am flying them now, would last long enough to give me the guarantees that you need for the length of time until we can start buying the airplanes we need. What we call that is a service-life extension program. We would have to go into some very expensive looks at that and do that kind of thing with several airplanes.

We would also have to go to the CINCs or come back to the Congress, or do both, and revise the Congressionally Mandated Mobility Study. That study is based upon starting from a given amount of capacity, which we would never reach. Therefore, we would have to change that mobility study completely, and we would have to come back to you with a new strategy on how to meet what the Congress has told us to do.

I would then also have to go to the CINCs that I support and say here is what is going to happen, and try to be as definitive as I could in this.

First of all, if I would be forced into using commercial airplanes, there are certain outsized things that you are not going to get by air. They cannot get them in any other airplane than the C–5 or the C–17. Therefore, they are going to have to go on Admiral Piotti's ships and, therefore, they are going to have to get there late.

So I will have to tell the supported CINCs, the fighting CINCs, that there are some things that I will not take and there are some things that are going to get there as much as 15, 20, or 30 days late, whatever it is.

What I am saying is that all of that outsized equipment—and 30 to 50 percent of our Army units are outsized, depending upon what kind of unit it is—that sort of equipment, then, would give Admiral Piotti a bigger problem, I just dumped the problem somewhere else.

The fact is, the stuff has to get there if you are going to prosecute the war. You have to get it there one way or another. And so, it is going to go by one of us.

Then I would ask those CINCs to come back to you and give you that impact. If, in fact, the fighter wing that CINCEUR is supposed to have on day 3 does not get there till day 7, what impact will that have on him on winning or losing the war? That is the kind of information you would have to have.

So I would hope, before the Congress would make such a decision that would be dramatic, that you would have us all back in to tell you exactly what that would be. We will give it to you straight, sir, you know that. But I can tell you right now, it will be debilitating. But I have one other offer for you.

If you really want to solve the problem and do it cost efficiently, let's get on with building this airplane and let's go to rate production. I can save you $1 billion a year, at least, by building this airplane at 36 a year, which is the capacity of the plant.

Senator EXON. General, not to interrupt you, but the only thing I can say to you is that we are going broke right now with all of the things that the Army, the Navy, and the Air Force are going to buy at a saving. You know, it's like the wife who could not afford to pass up the fur coat at half-price at the store.

I am being facetious, of course. I recognize that we have a very legitimate security need here. And I would just interrupt you by saying that you know my feelings about the C-17. I think it is a great aircraft. I think it is well designed, and from what I know of it, in the early stages it is going well. I think it will very capably carry out the very important mission that you have to perform.

The question I keep coming back to and my concern from the very beginning, when I conducted the first subcommittee hearings 8 or 9 years ago on the then C-17 was how are we going to pay for it.

Maybe the answer to that would be that this is outside your realm. But I would imagine that as one American you would be willing to pay more taxes to pay for it, if necessary, because you think it is that important.

General CASSIDY. Well, I certainly would not want to comment on the tax issue, sir. But I think it is terribly important. [General laughter.]

I also think it is important to all the services.

Here is a program that affects every service you have, that affects every serviceman in our country and affects everyone who is serving overseas now.

So, sir, I would offer to you that this has been one of the top three priorities of the Air Force for several years, and, therefore, when we start talking about which programs we are going to support fully, we should look at those programs that the services, arm in arm, have supported well, that rank high on the priority of our own Air Force, and then let's build it at a rate that is cheap. Let's get on and build it and solve that problem and get on to the next one.

Now, let me add one other thing, if I could, and that is buying commercial airplanes.

If I can talk unit cost, which is dangerous as the very devil, unit cost in 1986 dollars, the C-17 will cost us about $92 million, a 747 will cost us over $100 million, and the MD-11, the new version of the DC-10, will cost us somewhere around $80 million. So, the C-17 becomes cost effective even when you compare it with other alternatives.

I appreciate all the support you have given, and I appreciate your going down this road and giving me the opportunity to discuss the issue once again.

Senator EXON. I wanted to serve up a softball to you. [General laughter.]

Let me say that I wish you had been with me in the Budget Committee deliberations this morning when we took up function 050, funding heading for national security. I wish you could hear what I hear going around those tables, about what is going to happen to the Defense Budget.

It is not your responsibility, but I will be glad to report to the President when I see him that you did not come out for raising taxes, nor did you come out definitely against it. [General laughter.]

I think that might make him feel a little bit better.

General CASSIDY. Sir, if I may add, I am glad that Senator Exon and Senator Kennedy are representing us and working those problems. We could not have two better people doing it.

Thank you.

Senator EXON. Thank you very much.

There is one question that I have of the Navy, and I guess I had probably address it, to Admiral Piotti.

AIR FORCE/NAVY COORDINATION

Are you confident, Admiral, that there has been enough coordination between the Air Force and the Navy with regard to the delivery of critical materials around the world? Is there enough coordination and understanding between the sealift responsibilities that you have and the airlift responsibilities that the General has?

That is the first question.

The second question is looking at the Navy's budget this year I think there is a serious shortfall, in the sealift and amphibious assault capability of the Navy. And yet, I think there was a relatively minor recommendation for additional sealift and amphibious assault capability in the out-years. How many amphibious and sealift ships are we proposing to buy, and are you satisfied with that?

The answer will be no, I am sure. But I want to know how unsatisfied you are.

Admiral PIOTTI. Everything is relative.

But, to answer your questions, yes, I am satisfied. We go through an exacting process wherein we distribute the lift requirements. MAC is required for the initial and very near-term requirement which, in aggregate, represents 5 percent of the dry cargo, and about 1 percent of the POL. All the rest falls to me, 95 percent and 99 percent.

There is simply no other economical way to do it.

Senator EXON. So you think the coordination and cooperation is good, for that first part of my question?

Admiral PIOTTI. I think it is superb and will get better.

As you may or may not be aware, we are forming a U.S. Transportation Command, which General Cassidy will head up in a dual hat with his present role. The other members of the transportation triad—myself and General Honor at MTMC—will be the other component commanders.

So all of our mobility planning, all of our ADP interoperability, will be done by a single command.

Right now, the Joint Staff aggregates all the requirements for lift that are generated in support of the individual war plans and passes them on to us.

We will have more of an actual hands-on capability to massage those figures in the future.

Senator EXON. All right.

On the other question, do you want more airlift or two aircraft carriers?

Admiral PIOTTI. One doesn't have anything to do with the other.

Senator EXON. Oh, yes it does. Some of the things that you people have to be able to understand over there is that we are talking about a finite amount of money. Again, that is not your major responsibility, but it is ours. That is why I keep asking these questions, and I am not satisfied with your answer that one does not have anything to do with the other. From a budgetary prioritization perspective they certainly do.

It certainly does from the standpoint of the budget and the decisions that this committee is going to have to make.

Let me phrase the question so that I do not put you on the spot.

Are you satisfied with the number of sealift and amphibious ships that are being provided in this budget?

Admiral PIOTTI. I am.

My program, which the Navy embarked on at the same time we embraced sealift as our third function, has not wavered. We are apace with that plan, and the request for carriers does not impact it whatsoever.

That is why I said everything is relative.

The amounts of money that are required for sealift and to satisfy 90 percent or better of the total requirement is in the budget. It is not impacted.

Senator EXON. I am delighted to hear that. That is very good news.

Thank you.

Thank you, Mr. Chairman.

Senator KENNEDY. Thank you, Senator Exon.

We have other members of the committee who want to submit some questions, and they will be permitted to do that.

C-17

General Cassidy, I imagine that you are wondering when you hear the questions whether you are going to be back here defending the C-17 program again.

I must say I think the Congress has gone on record on that particular issue in the last session. I think that the case has been well made in the previous Congress. I think you made it again today.

I think the obvious question that I think we probably will face is whether there is going to be some slippage in the time given the various budget problems. I think you responded to that in the earlier round.

But it seems to me regarding the C-17, that we are finally being serious about airlift capability and capacity. We have finally seen much more attention to both airlift and sealift capability and capacity in recent years than we have seen previously. I think that is absolutely essential. You will find, I think, in talking to my colleagues, that there is strong support for the program. I think the issue will be whether it makes sense to defer it. I think you have responded to those particular questions.

If I could, let me get back to Admiral Metcalf, on the questions again of the ships. I have my own concerns about the additional aircraft carriers, and I think we have to try to find out what is the cost in terms of other well thought out recommendations, as I would have to assume they are, that you made to our committee.

We have the Chief of Naval Operations who gave us the list of ships he thought was going to be necessary, and then that was revised with Secretary Weinberger in December. We had one shipbuilding program approved by the DRB last fall and then 6 weeks later Secretary Weinberger approved another with the addition of the two aircraft carriers.

Given these circumstances, we have to ask ourselves, what does the cutback in terms of these other ships to pay for the new carriers mean in terms of our capability.

I know you have responded that you have found other efficiencies which you have been able to detect in the LSD-41 and DDG-51, which actually improve things.

I think the first question is this. I know that case has been stated previously. Of course the question comes down to why we were not able to detect these savings prior to the time the CNO came up here.

Let me ask you this question.

Were you actually consulted about the change in the request, the request of the Chief of Naval Operations, and the request of the Secretary, in terms of the surface ship requirements and request for the ship construction plan?

Admiral **Metcalf**. Yes, sir. I was involved in that.

Senator **Kennedy**. Did you make any recommendations?

Admiral **Metcalf**. Well, my——

Senator **Kennedy**. That can be answered either yes or no. [General laughter.]

Admiral **Metcalf**. Well, yes.

Senator **Kennedy**. Now, then, do you want to tell us what those recommendations were? [General laughter.]

Admiral **Metcalf**. I saluted smartly and walked off.

Senator **Kennedy**. I am not trying to put you on the spot, but we are entitled to find out, I think, what the recommendations were. Part of our reorganization purpose was to find out what the CINCs and others who have these command responsibilities recommend. Then we are going to have to make our own judgment.

Can you tell us what your recommendations were?

Admiral **Metcalf**. Well you have to understand what the opportunity was that came to do this.

I am an SCN manager, and as a worrier about what our force levels should be, you have to understand that those carriers are going to replace 50-year-old carriers. They are about 50 years old.

So, when you take a look overall about what does the Navy do and what are its responsibilities, both in peacetime, in a violent peace, as well as in wartime, you balance those things off and yes, in my judgment, we are on the right course.

Now, putting on my hat as the Deputy CNO for surface warfare, it is my responsibility to point out to the CNO and the Secretary that we are woefully short of the DDG class 51 and that we ought to be moving out in that area.

But, having said all that, because I thought that ought to go in to balance the equation, I thoroughly agree that the course of action we are taking is the proper one.

Senator KENNEDY. Well, I think I know what you are saying. Let's see if we can weave our way through it.

Admiral METCALF. Well, you asked me what my counsel was, and that was my counsel.

Senator KENNEDY. Well, let me put it in another way.

Wasn't your original recommendation contained in the original, unrevised, 5-year shipbuilding plan?

Admiral METCALF. Based on the assets and the fiscal guidance we had in the original plan, that is clearly what my first recommendation was.

However, time moves on.

Senator KENNEDY. That's fine. Thank you.

If I may, let me move to the sealift capabilities.

SEALIFT CAPABILITIES

Admiral Piotti, on the issue on manpower, you cite in your testimony and mentioned in your abbreviated testimony, the need for trained mariners. I think the study you cited in your testimony concluded that there is a shortfall of anywhere from 6,200 to 8,100 trained mariners.

Should we be giving a higher priority to solving this problem?

Admiral PIOTTI. There is a base of people out there who have had prior experience at sea, but who are not actively engaged in the maritime trade. We are not looking at the establishment of a Reserve program which will satisfy this shortfall. The base of people is there. We would only have to draw into the program licensed officers, both deck and engine, who comprise about 15 percent of that base and 1 to 2 percent from the unlicensed ratings base.

So I think the area in which we are proceeding will keep apace of the building program to achieve strategic sealift. As we build the things we have to lift and as we build the force to lift them, we also have to rebuild the base of people to sail the ships as these people are sunset as a result of the U.S. flag fleet decline.

I think all of that can be brought in together once the program is approved, and we expect that later on this year.

Senator KENNEDY. We have a long-term airlift objective of 66 million ton-miles per day. Do we have a similar objective for sealift?

Admiral PIOTTI. Yes.

It is 1 million short tons. As I indicated, we can satisfy about 60 percent of that requirement today and by the end of the 5-year defense program, we will satisfy 90 percent of that or a little bit beyond. That is based on the projected, but unknown, condition of the U.S. flag fleet. We also will have to grow in the U.S. Government fleet those additional assets required to meet the requirement if they do not exist in the U.S. flag fleet.

So, based on our projection of decline, we say we will be able to satisfy more than 90 percent of the total strategic sealift requirement.

Senator **KENNEDY**. The statement mentions shortfall of, I guess, 500,000 tons in 1990. Is that correct?

Admiral **PIOTTI**. That is 500,000 deadweight tons, which equates to 100,000 short tons. It is just a different measurement.

Senator **KENNEDY**. Against what requirement is that measured?

Admiral **PIOTTI**. That is against 5 million deadweight tons, which equates to 1 million short tons.

Senator **KENNEDY**. Of our current capability, can you tell us what portion comes from the Sealift Command and the Ready Reserve Force and U.S. flag merchant ships, flags of convenience shipping and allied shipping? Can you break that down for us?

If you want to submit that later in specifics, that would be fine. But can you give us some feel for that?

Admiral **PIOTTI**. I can give it to you specifically now. If we consider the 60 percent capability we have now to be 100 percent of our current capability, 43 percent of it resides in the Government-controlled MSC fleet; 43 percent resides in the RRF; 14 percent resides in the U.S. flag fleet.

Now that capability is available in a relatively short time, and by a "relatively short time," I mean 20 days.

If we go beyond 20 days, we have a capacity today of about 900,000 tons. That gives us the capability to increase the number of ships we would be able to pull from the U.S. flag fleet that, within the first 20 days, are malpositioned to satisfy our requirement, and it allows us to draw on some of the Effective U.S. Controlled Fleet.

In that case, the percents that I gave for the Government-controlled fleet would shift to 29 percent in the MSC Government controlled fleet and 29 percent for the RRF. Thirty-nine of the ships would come from the U.S. flag fleet and 3 percent from the Effective U.S. Controlled Fleet.

SEALIFT PROBLEMS

Senator **KENNEDY**. You have indicated that much progress has been made in the sealift function, but that serious problems remain.

Could you tell us what your views are on our sealift problems. What is the order of their seriousness? How would you rate them?

Admiral **PIOTTI**. Well, you would have to go back in history to World War II. We have always been a maritime nation, but we have been a supporting nation rather than what we are today: A supported nation.

Today, we are only carrying about 3 percent of our in-bound and out-bound cargo with the U.S. flag fleet, because our construction costs are higher, our crew costs are higher, and, therefore our cost to shippers is higher. World shippers are flag colorblind—their boards of directors want the lowest cost for transportation, and thus they ship on foreign flag ships. This has caused an accelerated decline in the U.S. flag fleet.

In addition, tax laws and incentives by foreign governments have caused a gross overtonnaging on the part of other world shippers.

So, today it is a shipper's market at a very low rate, and companies are filing Chapter XI. One of the oldest shipping lines in the world, U.S. Lines, did that at the end of last year.

As a result, the U.S. Government has had to create a reserve fleet of its own, because if it does not exist in the U.S. flag fleet, then it has to exist in the Government fleet.

We have created this reserve fleet not drawing totally on the same assets, although we have drawn on some of those that otherwise would go to the ship rakers. But we have drawn where there has been a lack of competitiveness or a small base from ships overseas to grow our capability against the requirements standpipe. We have gone from an RRF procurement program with zero ships in 1983, to a force of 82 ships today.

This is how we have gone about satisfying some of our sealift requirements.

On the other hand, as our U.S. flag ships are required to be more commercially viable, they have become very sophisticated and have gone to containerization. They are large, with small crews, and are non-self-sustaining.

So we have had to create companion programs under the sealift enhancement program—programs which, for example, make these ships capable of being off-loaded in the stream. We have bought three ships to date and are buying a force of 12 of what we call auxiliary crane ships, that can pull these containers off in the stream. We have had to develop the lighterage to go along with that. We also have had to develop systems where we could move cargo over unimproved beaches—offshore petroleum systems, and the like—to make what is out there more militarily useful.

We have done all these things. We set about creating a program to provide or improve sealift, and we have remained on track.

LIFTING OF MARINES

Senator KENNEDY. Admiral Metcalf, on the question of the capability of lifting the marines, as you know, we have three active and one reserve Marine amphibious force. The amphibious shipping objective is only to be capable of simultaneously lifting the assault echelon, the Marine amphibious force and the Marine amphibious brigade.

How do we plan to deploy or to employ the remainder of our marines in a major war?

Admiral METCALF. There are 62 amphibious ships in the fleet today, and all of these ships are required to lift a MAF. We require all of them.

We think we are going to have more than 50 of these amphibious ships available from 1996 onward. But when we have to get the follow-on echelon going, we have to rely on sealift provided by Admiral Piotti's forces, and turn-around amphibious ships. That is how we will do it.

Senator KENNEDY. How long would it take to assemble enough ships to lift an assault echelon of a Marine amphibious force?

Admiral METCALF. Well, it is scenario driven. It takes about 4 days to get all the ships underway, about 60 of them need to get underway; 4 days to load the troops and equipment.

Now, how far away, where do we have to go—that could make it from 10 to 30 days.

Senator KENNEDY. Is that the distinction between the Persian Gulf and Europe that you are talking about?

Admiral METCALF. Well, yes, whether you went around the Cape of Good Hope or through the Suez Canal, how you went.

Essentially, that is where the 30 days that I answered Senator McCain comes from. So, if you are going to start from a standing stop and you want to lift a whole Marine amphibious force, that is a significant evolution and a reasonable planning factor, a little over a month.

Senator KENNEDY. Is your testimony that being able to lift the assault echelon of the Marine amphibious force and the Marine amphibious brigade, that the current programs will be able to meet that objective by 1996?

Admiral METCALF. Yes, 1996. That is correct, sir.

Senator KENNEDY. Thank you.

Now, LSD obviously is an amphibious ship. That was slipped in terms of the revised construction plan, was it not?

Admiral METCALF. What is called the LSD Cargo Variant—we have a gap in the program and we have it, I think, for a very good reason. We orginally considered that to be just simply a follow-on from the LSD straight-stick, without a modification to carry cargo.

However, as we got into that program, it became prudent that what we really ought to do is to treat the ship like a new construction ship. Put in a gap, so that we could learn as we built the ship if there were any changes.

This is standard practice when we go along and build new ships.

Senator KENNEDY. Well, it may be standard practice, but you made that decision within about a 6-week period. I am not sure what information you had when the final recommendation was made that you did not have when the Chief of Naval Operations issued his posture statement. That is what we have to look at.

Everything you have said, I am sure, is so, but I do not know why you wouldn't have known that earlier, when the Chief of Naval Operations made the recommendations.

That is just my comment, not yours, unless you want to give some reaction to it. I think it is a pretty obvious one.

Admiral METCALF. The total buy in this thing is the same, Senator. It is a matter of gapping a year.

Senator KENNEDY. Do you know how the marines felt about that? I suppose it is best to ask them. I mean about the slippage in the LSD-41.

Admiral METCALF. Oh, I think if I were to ask the marines, they would not be overjoyed. But I think they understand what is going on.

Senator KENNEDY. And I think we understand what is going on, too.

OK. I want to thank all of you.

I just want to let you know that I think in terms of our security interests, the whole capability of sealift and airlift is absolutely essential. I have expressed some of my concerns about certain types of weapon systems, but it seems to me that unless we have this kind of capability and capacity, so many of the other expenditures which we are authorizing and appropriating for become meaningless, or they could become meaningless in any kind of conflict.

As far as I am concerned, these areas ought to have a very high priority. I think what the Navy has done in recent years, in the purchase of various ships and the mothballing of those, has been imaginative, positive, and has been creative. This is certainly a program which I support.

I think you have highlighted the needs for the C-17 and for the support in some of these other areas and have given us a good basis for being able to make the case for a strong capability, both in airlift and sealift.

I want to express my appreciation to the panel.

We will submit some other questions and would hope you would be able to get your answers to us quickly. We will probably be back to you as we move on the period in terms of the markup and the authorization to seek out some additional information.

There being no other questions at this time, the committee stands in recess.

[Questions for the record with answers supplied, follow:]

Questions Submitted by Senator Pete Wilson

SHORTFALLS

Senator Wilson. In 1984 and 1985, the Department of Defense completed studies on sealift that determined a shortfall in tankers, dry cargo ships and merchant seamen necessary to meet mobilization requirements. Has this situation changed?

Admiral Piotti. The situation has not changed. Today the U.S. merchant marine—both ships and mariners—is in an accelerated rate of decline. Forty years ago we had the strongest merchant fleet in the world: approximately 5,000 ships; today we have fewer than 500 ships, and about 20 percent of those are laid up. This condition projects to a military shortfall of approximately one-half million deadweight tons by 1990. In addition, a joint Navy/Maritime Administration study completed in August 1986 reflects a projected initial maritime personnel shortage of about 6,200 and a sustaining shortfall of more than 8,100 trained mariners.

NAVY SHIP CONSTRUCTION

Senator Wilson. Do you concur with Everett Pyatt's testimony on March 17, 1987 before the House Armed Services Committee, Seapower Subcommittees that Navy ship construction and repair cannot maintain our shipbuilding and repair mobilization base?

Admiral Metcalf. Yes. We presently have 80 ships under construction or conversion in 16 private shipyards throughout the Nation. Approximately 40 additional yards are involved in Navy overhaul and repair programs. Nevertheless, this work is not sufficient to support our present shipbuilding base. The decline in commerical repair work and the absence of any commercial new construction orders have caused this problem. It cannot be cured in the Navy budget.

SHORTFALL SOLUTIONS

Senator Wilson. What action or actions has the Navy taken to solve the shortfall of ships, people to man them, and facilities to build them?

Admiral Piotti. The Navy has undertaken a number of new programs to enhance our strategic sealift assets and to improve the military usefulness of U.S. merchant ships. The first of these is the Ready Reserve Force [RRF]. The RRF currently consists of 82 ships and is programmed to grow to 122 by 1992. It is made up of older general cargo, barge carriers and roll-on/roll-off ships that are no longer able to compete economically in commercial trade. The ships are kept in a 5, 10 or 20 day readiness status.

The Navy also has deployed three squadrons of Maritime Prepositioning Ships to Diego Garcia, the Eastern Atlantic and the Guam-Tinian area. Each squadron consists of four or five ships and carries equipment and supplies to support a full marine amphibious brigade of 16,500 men for 30 days.

We also bought eight large container ships and converted them into Fast Sealift Ships [FSS]. The FSS are 946 feet long and can travel in excess of 30 knots. They allow us to move an entire mechanized division quickly to distant trouble spots.

In addition, we have added two hospital ships, two aviation support ships and five new T-5 Class tankers to our sealift fleet. We also have acquired three (later to grow to a fleet of twelve) auxiliary crane ships. These crane ships are designed to discharge the non-self sustaining container ships that make up most of the active U.S. merchant fleet.

The Navy also has devoted significant resources to our sealift enhancement program which improves merchant ship capabilities to conduct strategic sealift, to augment direct fleet support ships and to deliver cargo to areas where there are no existing cargo handling facilities.

To address the projected contingency manpower shortage, the Navy and the Maritime Administration are studying the establishment of a maritime reserve program made up of former experienced mariners.

Your question on shipbuilding facilities can best be addressed by Naval Sea Systems Command or ASN (S&L). MSC does not build ships; however, MSC ships are overhauled or repaired in U.S. shipyards in compliance with Section 9101 of the fiscal year 1987 Continuing Appropriation Act. In addition, any overhaul or conversion work performed on ships purchased for the RRF is accomplished in U.S. shipyards.

REPLACEMENT OF SEALIFT CLASS TANKERS

Senator **Wilson**. I understand you have been studying a program to lay-up nine (9) 15-year old tankers and replace them by a new build charter program. The older ships would be added to the RRF. The new modern ships would create some badly needed construction work for our yards. Could you please let this committee know what the status of this program might be? Would you also provide to this committee the cost of terminating or buying the nine (9) older tankers for the RRF?

Admiral **Piotti**. There is no tanker replacement program as such. MSC continually evaluates its tanker needs for the future. When circumstances warrant; e.g. the implementation of the Port and Tanker Safety Act which has an impact on the Sealift class tankers in 1989-90, a special review is conducted. It is to this review that you refer.

MSC evaluated a number of alternatives, including laying up the nine Sealift class tankers and placing them in the RRF, and concluded that lay up would not be in the best interests of the government. This is due to the high cost to terminate the bareboat charters ($86.4 million) plus the cost to replace the tankers. It is important to note that the contract for charter of the Sealift class tankers prohibits their sale to the government when the contracts are terminated. This prohibition eliminates their placement in the RRF. In addition, these ships are much more cost effective than any newly built alternatives because of their size and capacity in areas where such restrictions prevail.

If additional tanker capacity is needed in 1990 and beyond, it may be necessary to build new ships. We anticipate that such ships would be larger tankers, capable of performing more economically on longer voyages such as that between the Persian Gulf and the Western Pacific.

Senator **Wilson**. Do you feel that for strategic as well as mobilization reasons it is important that the Navy have an active combatant ship building capability on the west coast?

Admiral **Metcalf**. Yes.

[Whereupon, at 3:50 p.m., the subcommittee recessed, to reconvene upon the call of the Chair.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEARS 1988 AND 1989

WEDNESDAY, MARCH 25, 1987

U.S. SENATE,
SUBCOMMITTEE ON PROJECTION FORCES
AND REGIONAL DEFENSE,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

NAVY MINE WARFARE

The subcommittee met in executive session, pursuant to notice, at 3:04 p.m., in room SR-232A, Russell Senate Office Building, Senator J. James Exon presiding.

Present: Senators Exon and McCain.

Staff present: Patrick A. Tucker, minority counsel; George K. Johnson, Jr., Ronald P. Kelly, James R. Locher III, David S. Lyles, Norman G. Mosher, Gordon G. Riggle, and Mark B. Robinson, professional staff members; Russell C. Miller, research assistant; Lori M. Jackson, staff assistant.

Also present: Jeffrey B. Subko, assistant to Senator Exon; William J. Lynn, assistant to Senator Kennedy; William J. Wight, assistant to Senator Warner; Dale F. Gerry, assistant to Senator Cohen; Jay L. Kriss, assistant to Senator Wilson; Samuel J. Routson, assistant to Senator Symms.

OPENING STATEMENT OF SENATOR J. JAMES EXON, PRESIDING

Senator EXON. The subcommittee will please come to order. This afternoon's hearing is on mine warfare, a very, very important subject that I think all too often we take for granted. But there are those of us on the Armed Services Committee who have been very much concerned about this for a long time. It is a subject that does not attract the same attention as the big ticket defense programs, such as nuclear aircraft carriers, the C-17 cargo plane and the SSN-21 nuclear submarine, which have been the subject of previous hearings.

Mine warfare, however, would play an indispensible role in our national strategy in the event of a war. The Soviet navy must pass through several critical choke points to break out into the open sea and threaten our resupply convoys to Europe and the Pacific. The United States could employ mines to help keep the Soviet fleet, particularly its submarines, penned up in their home waters.

Currently this is a key Soviet weakness that we are not fully exploiting because of the deficiencies in our offensive mine warfare capability. Those who have followed this very closely over the years feel there is lack of full attention by the Navy in addressing this. As is the case all too often some of our more exotic programs receive all the attention and far too much of the money.

At the same time when the Soviets are continuing to build up a substantial mine warfare threat of their own. They can seed the entrances to our harbors and critical sea lanes with mines. They can severely limit our ability to rapidly reinforce our allies. The U.S. ability to clear these vital marine highways is sadly lacking, in the opinion of this Senator.

Despite the critical importance of mine laying and mine clearing, both activities have long been the neglected stepchildren of U.S. defense planning. Currently the Navy maintains only three active duty minesweepers with an average of 32 years of service. Although there are an additional 18 minesweepers in the Naval Reserve, they are just as old and would not be immediately available in the event of war.

Similarly, too many of our mines are from the 1950s and 1960s, with limited capabilities. Recently we have embarked on a program to improve our mine warfare capabilities. We are building a new open-ocean mine countermeasures ship, a new coastal mine hunter, and a new helicopter for mine countermeasures. We are also developing several new types of mines, [deleted].

The primary reason for this hearing is twofold—to review programs on these ongoing modernization efforts and assess whether these efforts will be sufficient to remedy our longstanding deficiencies in mine warfare and, if not, how long is it going to take us to reach that threshold. At this hearing we are pleased to welcome Rear Adm. Robert Klee, the Director of the Navy's Combat Logistics, Auxiliaries, Amphibious and Mine Warfare Division.

I will be here conducting this hearing on behalf of Senator Kennedy, who is the chairman of this subcommittee, but has another commitment and Senator Kennedy may have, as I understand it, a chance to drop in. We will have others, undoubtedly, coming in this afternoon.

So, with that, I would appreciate your proceeding with your presentation in any form that you would like, and, without objection, we will include my opening statement as part of the record. This statement was made on behalf of Senator Kennedy.

[The prepared statement of Senator Exon follows:]

PREPARED STATEMENT BY SENATOR J. JAMES EXON [D–NE]

The subcommittee meets today to focus on Navy mine warfare programs, both defensive and offensive. As my colleagues and many representatives of the Navy here today know, this Senator has been a very strong advocate of naval mine warfare. This is a warfare area which is important both because the Soviets have invested tremendously in mines but also because the Soviet navy is itself very vulnerable to mining.

Yet, the Navy, in my opinion, has not given mine warfare the importance it deserves. For example, in a fleet of 600 ships, only 31 will be dedicated to mine sweeping. Our helicopter minesweepers are also experiencing problems and are limited in their capability. This lack of preparedness is contrary to logic given that the Soviet Union has the largest and most modern mine inventory in the world, as well as many diverse ways of emplacing those mines.

Furthermore, rather than buying more inexpensive minesweepers to ensure that our existing bases and ports will remain open, the Navy would rather build more ports in an attempt to make the fleet less vulnerable. This Senator does not understand this.

I also do not understand how a nation that has experienced the mining of its ports by German U-boats and, in fact, mounted massive, paralyzing mining campaigns against both the Japanese in World War II and the North Vietnamese can forget the effectiveness of this weapon. Yet we seem to have done so for our stocks of mines are limited, aging, and we are not a high priority within the Navy for modernization.

It would be unfair to say that the Navy has ignored all these concerns or that there is something wrong with the professional judgment of our naval officers. I suspect instead that what has caused the low priority given to mine warfare is a perceived lack of resources. I submit, however, that this is an example of "penny wise, pound foolish."

To our witness, Rear Adm. Robert Klee, the Director of the Combat Logistics, Auxiliary, Amphibious, and Mine Warfare Division of the Department of the Navy, I say welcome. My opening broadside is not necessarily intended for you or the Navy personnel involved with mine warfare. I know that the men and women of the Mine Warfare Command are dedicated to their profession and share many of the concerns I have stated.

Senator Exon. With that, I would like to say that we welcome you. Do you have prepared testimony or not?

STATEMENT OF REAR ADM. ROBERT E. KLEE, U.S. NAVY, DIRECTOR, COMBAT LOGISTICS, AUXILIARIES, AMPHIBIOUS, AND MINE WARFARE DIVISION, ACCOMPANIED BY CAPT. PAUL F. ERNY, USN, HEAD, MINE WARFARE BRANCH, STRIKE AND AMPHIBIOUS WARFARE DIVISION; CAPT. FREDERICK A. FARBER, USN, PROGRAM MANAGER, MINE WARFARE SYSTEMS; AND CAPT. JOHN G. CHAMPLAIN, USN, PROJECT MANAGER, MCM AND MHC SHIP ACQUISITION

Admiral Klee. Good afternoon, Mr. Chairman. I am Rear Adm. Bob Klee, Director of Combat Logistics, Auxiliary, Amphibious and Mine Warfare Division in the Office of the Chief of Naval Operations.

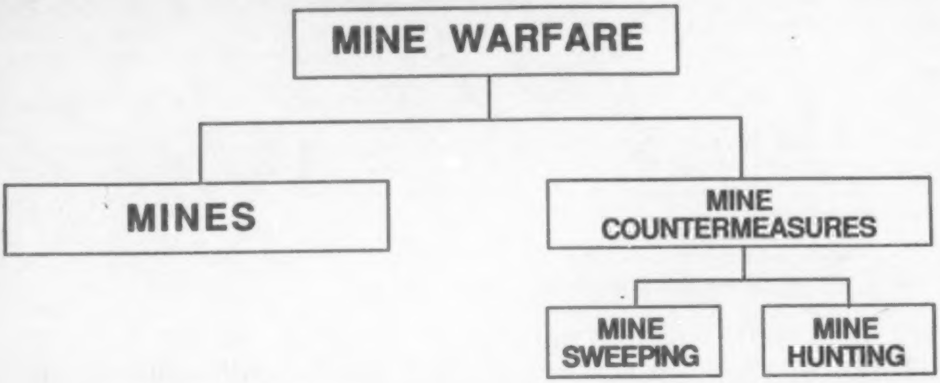
I have with me at the table today Capt. John Champlain, who is program manager for the Naval Sea Systems Command for Mine Countermeasures Ship Acquisition; Capt. Fred Farber, who is program manager for mines and surface mine countermeasures for the Naval Sea Systems Command; and, finally, Capt. Paul Erny, who is head, Mine Warfare Branch, Naval Warfare Division, Office of the Chief of Naval Operations.

I appreciate the opportunity to appear before this subcommittee to provide an overview of our mine warfare program. Mine warfare is one of the smaller of the Navy programs as far as total obligational authority is concerned, but it is nevertheless an important part of the maritime strategy.

Mine Warfare—Historical Impact

2,665 ships sunk or severely damaged, WW II.
Delayed major Korean amphibious landings.
Closed Suez Canal.
Closed Haiphong Harbor . . . Vietnam.
Red Sea mining.
Threat of Persian Gulf mining.

One need only look at history to clearly see that mine warfare has played a significant role. For example, in World War II 2,665 ships were either sunk or damaged beyond repair by allied mines. Major amphibious landings in Korea were delayed by a rather unsophisticated mining operation. Mining closed the Suez Canal. The port of Haiphong was successfully closed during the Vietnamese war. Red Sea mining has recently reminded us of the power of mine warfare and has emphasized yet another use of this warfare area—namely a weapon of terrorism. Finally, we live daily with a mining threat in the Persian Gulf.



Unlike other warfare areas, mine warfare is divided into two totally different divisions, namely mines and mine countermeasures. Mining covers the actual planning and laying of minefields in enemy waters, international waters, and in home waters. Mine countermeasures involves our capability to counter minefields which the enemy has laid to resist achievement of allied goals.

Mine countermeasures, in turn, is divided into two areas—namely minesweeping, that is countering a minefield by towing devices that mechanically cut mooring cables or simulate target signatures to detonate the mines; and mine hunting, countering individual mines by sonar location for subsequent neutralization using explosive devices. Interesting to note is the fact that mine warfare includes over 3,000 personnel, about 50 percent of whom are Reserve personnel.

My briefing this afternoon will cover both mines and mine countermeasures.

Senator Exon. Admiral, could you stop it right there for just a moment?

Admiral Klee. Yes, sir.

Senator Exon. You said there were 3,000 involved in this, of which half are Reservists. Is that what you said?

Admiral Klee. Yes, sir. Eighteen of our MSO ships are Reserve ships now. Three are active duty.

Senator Exon. And those by and large, I assume, the 1,800 are new people coming in for training in the Reserve. How long a period of time.

Admiral Klee. Not necessarily, Senator. They sometimes are Reserves who have done their 4 years of active duty and are in the Reserves and man these ships. Others have done a 6-month tour and are getting training. But each ship is manned approximately by 70 percent Active and 30 percent Reserve.

Senator **Exon**. I see. Okay. So it is a mix of Active and Reserve.

Admiral **Klee**. Yes, sir. And our COOP program is 100 percent Reserve.

My briefing this afternoon, Mr. Chairman, will cover both mines and mine countermeasures, the threat, our warfighting capability together with that of our allies, an assessment of the shortfalls, and our procurement strategy.

The mine warfare threat can be divided into two categories, namely the types of targets or naval operations that our mines must counter, and the types of mines and mining operations that our mine countermeasures must neutralize.

[Slide deleted.]

As far as targets are concerned, [deleted]. Submarines represent the most stringent mine target and the target that is anticipated to change the most into the year 2000.

SUBMARINE NOISE TRENDS FOR 5 KT AT 2 KHZ

[Deleted.]

This vugraph illustrates the Soviets submarine acoustic quieting trend to the year 2010. I think the important thing to look at here is in the early sixties we had relatively noisy submarines of the *November, Echo* and *Yankee* class. [Deleted.] I will be discussing more about our need for a new and improved target detecting mechanism as we go on.

SOVIET SUBMARINE ASW WARHEAD VULNERABILITY

[Deleted.]

[Deleted.]

USSR MINE SUMMARY

[Deleted.]

Now, significant also from the point of view of Soviet resistance to our mining operations is the fact that the Soviets have over 500 mine countermeasures assets, mostly surface vessels but including helos with which they can counter our mining efforts.

The Soviet threat to our mine countermeasures capabilities is equally impressive. An overview of Soviet mine assets has been illustrated by this vugraph. It is no secret that the Soviets have a significant mine inventory ranging from pre-World War II mines to mines which represent the latest propelled warhead technology. Soviet mine inventory numbers [deleted] 300,000 [deleted]. A distinct Soviet mine design trend is toward deep ASW mining.

Clearly the Soviets and their allies represent a major mining and mine countermeasures threat. I believe, however, that we, combined with our allies, have the resources and the technology to successfully counter this threat, as I will explain during the remainder of my briefing.

CINC MINEFIELDS

[Deleted.]

In this portion of my briefing I will discuss our specific responses to the threat that I have outlined. My discussion will include a brief summary of U.S. and allied mine warfare plans and a review of our ability to provide the platforms, mines, and equipment to accomplish these plans.

U.S. mining plans include offensive mining [deleted]. By "offensive mines" I mean mines used in areas normally controlled by Soviet naval forces—that is, in their own back yard. Defensive mining—that is, mining in open ocean sea lanes to control Soviet naval operations—[deleted]. In addition to being responsible for their own defensive mining, our allies are also responsible for contributing to mining [deleted]. Additional coordination is underway for further allied mining contributions.

U.S. MCM STRATEGY, TACTICS, PLANS

Priority I:
[Deleted.]
Priority II:
[Deleted.]
Priority III:
[Deleted.]

The U.S. mine countermeasures strategy includes clearing our military ports and all resupply ports shortly after commencement of hostilities. Other mine countermeasures tasking includes clearing carrier operating areas and clearing amphibious operating areas. Allied contribution to mine countermeasures includes clearing their own ports and approaches [deleted]. I will now discuss our ability to implement the above plans in terms of mining and mine countermeasures capabilities for both the United States and our allies.

CURRENT AND PROJECTED MINING CAPABILITIES (SUMMARY)

[Deleted.]

Recent fleet introduction of Captor, Quickstrike, and submarine launched mobile mine (SLMM).

Allies also have a significant mining capability.
  England
  Germany
  Italy
  Japan

Current R&D aimed at maintaining a strong mining capability into 21st century.

The U.S. mining capabilities are summarized on this slide.

Senator **EXON**. Admiral, could you back up to that map you had before? I was just curious. I did not quite understand. What are those white markings? What is the significance.

Admiral **KLEE**. These are the choke points that we are interested in throughout the world. The darker areas concern our allied area of responsibility—that is, the home waters and home ports.

Senator **EXON**. In other words, that choke point off the U.K. would be primarily the responsibility of the British and the Norwegians?

Admiral **KLEE**. Generally speaking, yes, Senator.

Senator **EXON**. And the lines going on down into the [deleted].

Admiral **KLEE**. Generally speaking, the NATO allies have the responsibility for clearing their own ports [deleted].

Senator **EXON**. It looks to me like that goes over [deleted].

Admiral **KLEE**. Very little. I would say it should stop [deleted] sir.

Senator **Exon**. [Deleted] I never envisioned that they had too much in that area.

Admiral **Klee**. They do not, Mr. Chairman. The southern allied members, [deleted].

Senator **Exon**. [Deleted.]

Admiral **Klee**. [Deleted] yes, sir.

Senator **Exon**. I guess that circle in the Pacific, [deleted] over there. Is that right?

Admiral **Klee**. Yes, sir.

Senator **Exon**. Whose is that—ours? They do not have anything?

Admiral **Klee**. [Deleted.]

Senator **Exon**. [Deleted.]

Admiral **Klee**. Yes, sir. They are the only country besides ourselves who now have a significant air mine countermeasures capability. They have a squadron of essentially RH-53-Ds, and they will replace them with the MH-53E, as we are doing. They have Mark-103, 4, and 5 sweep gear, which is what we use today. They are thinking of buying the new gear that we are developing that is rather expensive, and that is still in the negotiation stage. But, yes, sir, they have a significant capability.

Senator **Exon**. And the circles are choke points?

Admiral **Klee**. Yes, sir. [Deleted] are building some mine countermeasures ships.

Senator **Exon**. Nothing too extensive, I would expect.

Admiral **Klee**. No, sir.

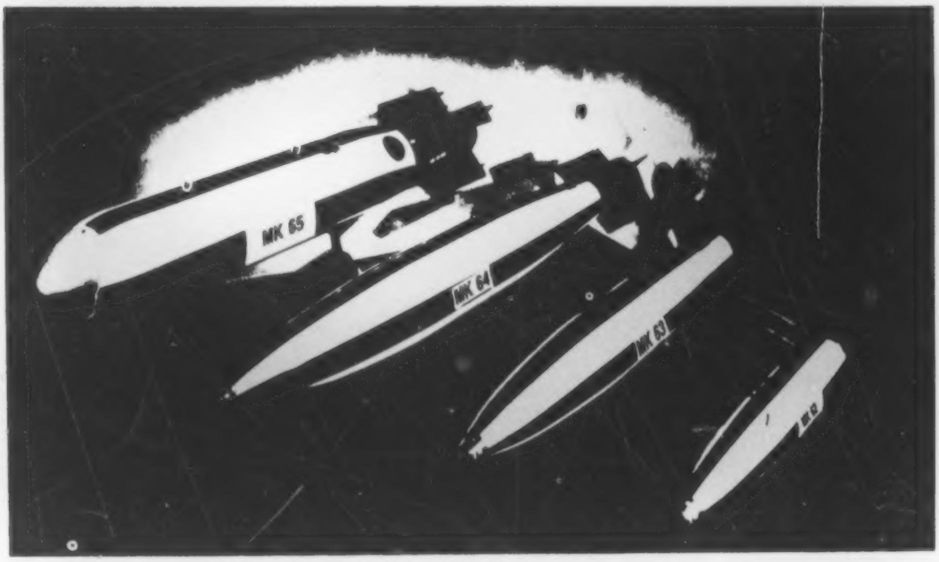
Senator **Exon**. Thank you. I am sorry to interrupt you. I was puzzled about what that was.

CURRENT U.S. MINES (1987)

[Deleted.]

Admiral **Klee**. Now these mines are deliverable from aircraft, submarines, or surface ships, with aircraft and submarines used most often. Aircraft delivery normally includes both Navy aircraft and Air Force resources, such as the B-52. Captor, Quickstrike, and the submarine-launched mobile mine, which are now entering the inventory, will go a long way toward improving our in-service mine posture, but much effort needs to be done.

As you can see, Mr. Chairman, these are divided into essentially three categories—bottom mines, our deep-moored mines and our medium-depth moored mines. We have a good capability in bottom mines, a good capability with our deep-moored Captor mine, [deleted]. I will be talking later about an advanced sea mine which is a U.S.-U.K. collaborative effort which we hope will fill that gap.



This is the Quickstrike family, as illustrated by this photograph. The standard iron bombs are on the right, the special thin-walled, 2,000-pound Quickstrike on the left. This particular Quickstrike is the Navy's most powerful conventional underwater weapon.

[Slide deleted.]

This is an external view of a Captor mine, which is illustrated on this slide, and a cutaway view of the Captor is shown on the next slide.

[Slide deleted.]

Note the 46 torpedo. This is the standard Navy ASW torpedo used by aircraft, surface craft, and the Captor mine.

[Slide deleted.]

This photo shows the Captor mine mounted on the wing of an Air Force B–52. This aircraft can carry 18 Captor mines, five on each wing and eight in the bomb bay.

ADVANCED SEA MINE (ASM)

[Deleted.]

I talked about the need for a new medium-depth mine. This is required to counter the submarine threat in the medium water depth—[deleted] which account for two-thirds of our planned minefields. The advanced sea mine program has been initiated as a U.S.–U.K collaborative effort to fill this significant shortfall.

Further, [deleted] mines is essential to provide the CINCs with the tactical leverage [deleted]. This capability can be critical at or near the start of hostilities. What we would like to do is have the capability [deleted].

The [deleted] with initial program activities currently under way. In addition to the Advanced Sea Mine, [deleted] the Navy is well along with development path for providing a programmable targeting-detection device for the Quickstrike family of mines. This target detection device will [deleted] to provide excellent countermeasures resistance for Quickstrike.

Our allies are also improving their inventory, most notably in the area of improved target detection capability.

CURRENT AND PROJECTED MINE COUNTERMEASURES CAPABILITIES SUMMARY

Existing U.S. MCM platforms old, limited in quantities.
Existing U.S. MCM equipment old and hard to maintain.
New platforms and equipment coming on line.
Existing allied situation:
Most allies have new mine countermeasures vessels in commission or on order.
Allies generally have modern equipment.

Turning now to mine countermeasures, this vugraph summarizes the U.S. and allied capabilities. The major thrust is toward building new platforms, both surface and air. U.S. in-service mine countermeasures surface platforms, the Minesweeper Ocean and the Minesweeper Boat, are 1950s vintage ships which are becoming increasingly difficult to maintain. These ships are augmented by the RH-53D helicopter platforms which, while effective, have limited time on station and limited tow capability.

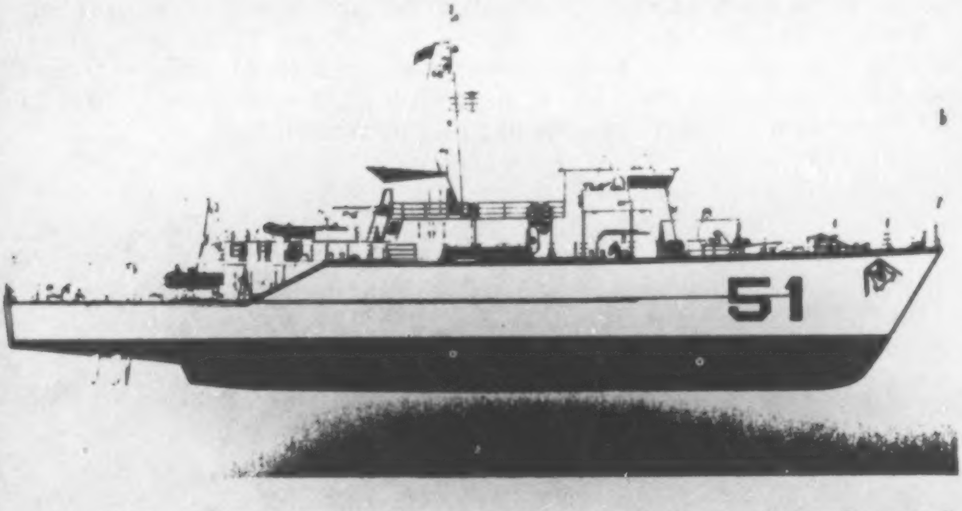
In-service equipment for the surface platform is typically of World War II vintage or, at best, early 1950s vintage. In-service equipment for the helos, though not as antiquated as the ships, is still dated technology.

Our allies have a substantial mine countermeasures capability with several new classes of mine countermeasures ships in service or currently under development. Similarly, allied equipment, while based in great part on U.S. equipment, represents the state of the art in areas such as mine neutralization and acoustic sweep gear.

Fortunately for the United States, things are going to improve rapidly. We are on the brink of seeing the results of a major thrust towards improving the U.S. mine countermeasures scene. First of all, three new platform classes are under construction.

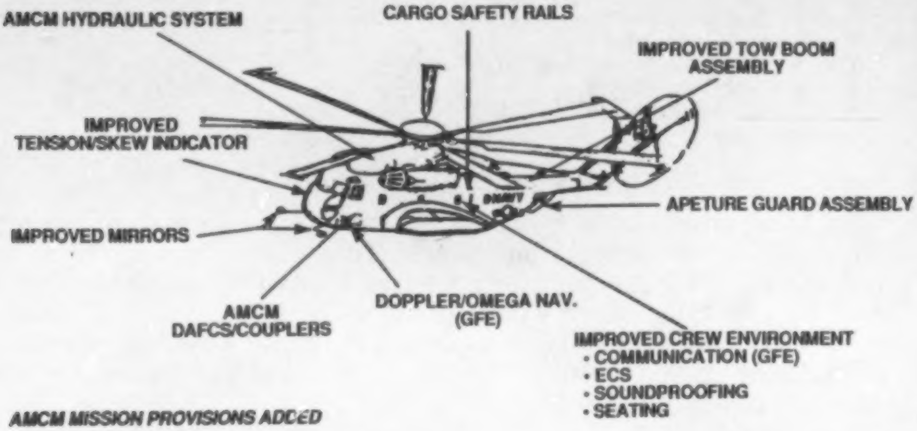
USS AVENGER (MCM 1)

The open-ocean MCM-1 class ship will be the free world's largest and most advanced mine countermeasures ship and will incorporate a new mine-hunting sonar, the new mine neutralization system, and the new precise integrated navigational system.



In addition to the MCM-1, we are planning a new class of coastal mine countermeasures ships, the MHC-51, which will incorporate Italian hull technology.

MH-53E AMCM CONFIGURATION



AMCM HYDRAULIC SYSTEM

CARGO SAFETY RAILS

IMPROVED TOW BOOM ASSEMBLY

IMPROVED TENSION/SKEW INDICATOR

APETURE GUARD ASSEMBLY

IMPROVED MIRRORS

AMCM DAFCS/COUPLERS

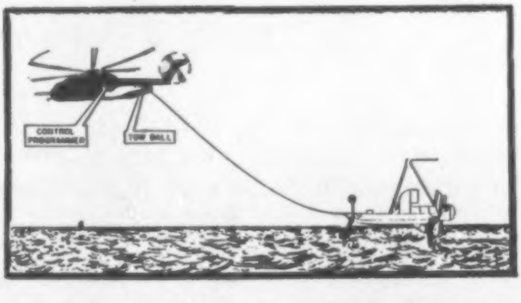
DOPPLER/OMEGA NAV. (GFE)

IMPROVED CREW ENVIRONMENT
- COMMUNICATION (GFE)
- ECS
- SOUNDPROOFING
- SEATING

AMCM MISSION PROVISIONS ADDED

Finally, the new three-engine MH-53E, the world's most powerful helicopter, will be introduced soon to significantly increase time on station and tow capability for air mine countermeasures.

AN/ALQ-166 MAGNETIC SWEEP



MISSION

1. EFFECTIVELY SWEEP MAGNETIC MINES,FROM SENSITIVE TO COARSE SETTINGS
2. WITH ADDITION OF COMPATIBLE ACOUSTIC SWEEP, e.g. MK 104, [deleted]

SYSTEMS MILESTONES

TECHEVAL	4TH QUARTER FY 1989
OPEVAL	1ST QUARTER FY1990
MILESTONE III	3RD QUARTER FY1990
PRODUCTION	FY 1991

Along with these three new platforms, considerable U.S. mine countermeasures development is under way to provide equipment commensurate with the capabilities of the new platforms. I have already mentioned the new mine-hunting sonar, mine neutralization system, and the precise integrated navigation system for these ships. Also under development is a new air-towed magnetic sweep, illustrated by this slide, a new deep mechanical sweep, and a new air-launched neutralization device to neutralize mines after they have been identified by hunting practices.

REPRESENTATIVE PROJECTED ALLIED MCM PLATFORMS (FUNDED AND UNDERWAY)

Surface . . . many new classes of mine countermeasures vessels are being introduced world wide for example:

"Tripartite" vessels . . . France, NL, Germany.
"Lerici" vessels . . . Italy.
"Hunt Class" vessels . . . UK.
Plus many others.
Air:
Japan . . . MH-53E mine countermeasures helicopter.

The U.S. mine countermeasures situation is improving significantly, and so is that of our allies. This chart lists some of the many classes of mine countermeasures ships that are being introduced by our allies worldwide. Along with these new ship classes, our allies are also heavily involved in equipment development, including new mine hunting sonars, new mine neutralization systems, and new mine acoustic sweep gear.

CURRENT U.S. AND ALLIED MINE WARFARE TRENDS

Mine Design:
[Deleted.]
Propelled warhead.
Microprocessor technology.
Surface MCM:
Many new platforms.
Trend is toward minehunting.
[Deleted.]
[Deleted.]
[Deleted.]
Airborne MCM:
[Deleted.]

Thus far I have summarized the threat, the U.S. and allied plans to meet the threat, and the U.S. and allied forces and equipment available, under development, or under procurement to allow these plans to be fulfilled. Before I make an assessment of the mine warfare shortfalls, I would like to briefly touch on key mine warfare trends which help us to evaluate mine warfare at the top level.

This vugraph summarizes the following trends in today's U.S. and allied mine warfare programs. [Deleted.] In addition, the trend is clearly toward development of a propelled warhead mine—that is, the United States-United Kingdom Advanced Sea Mine, and toward developing mines which are programmable to offer out-year versatility.

Second, the United States and its allies are embarked on a major effort to upgrade surface mine countermeasures capabilities. A new wave of mine countermeasure ships is entering service within the United States and within our allies. These ships and their associated new equipment will establish a modern mine countermeasure capability which emphasizes mine hunting. [Deleted.]

Third, the United States is shifting the emphasis on air mine countermeasures from that of a precursor capability—that is, a search ahead of the surface mine countermeasures forces—to that of a stand-alone capability capable of sweeping, hunting, and neutralizing mines.

I will now make an assessment of our mine warfare situation based upon the information presented thus far. Mining will be considered first.

MINING ASSESSMENT

Current capability:
[Deleted.]
Strong bottom mine capability, [deleted].
Strong deep water capability.
[Deleted.]
Projected capability:
With completion of ongoing R&D and procurement efforts, mining capability will be [deleted].

[Additional information follows:]

Our current mining capability, including that of our allies, can be considered [deleted] even with completion of ongoing Captor, Quickstrike, and SLMM procurement. We have a strong bottom mine capability and a strong deep water capability [deleted]. In addition, [deleted].

With the realization of our projected U.S. and allied mining capability (that is, programs that are funded and underway) the mine assessment increases [deleted]. The addition of the Advanced Sea Mine, the Quickstrike microprocessor Target Detection Device MK 71 resolves many of the shortfalls of today's inventory. However, [deleted] some key shortfalls will remain. In particular:

Captor must be improved to maintain performance against the year 2000 threat. [Deleted.]

SLMM range must be increased [deleted].

Mine delivery must be improved. In particular the concept [deleted] needs exploration, [deleted].

MINING ASSESSMENT (CONT.)

Shortfalls (in priority order):
Must improve Captor to maintain effectiveness against circa 2000 threat.
Must increase range of SLMM [deleted].
Must develop improved mine delivery techniques and equipment.
Must develop a follow-on [deleted] target detection device.

This would be next technological step of a new target detection device currently under development for Quickstrike.

MINE COUNTERMEASURES ASSESSMENT

Current capability:
Surface platforms and equipment [deleted].
Airborne platforms and equipment [deleted].
Allied capabilities are significant.
Projected capability:
Major improvements from new U.S. platforms and equipment.
Allies will commission many new platforms, with associated equipment.

Referring now to mine countermeasures, the current assessment of surface capability [deleted]. Our present in-service surface platforms and equipment represent 1950's and earlier capabilities that simply do not address today's threat. Fortunately, as previously mentioned we are on the brink of a significant improvement in the surface situation.

Our allies generally have more capable surface mine countermeasures capabilities which, as with the United States are soon to be improved.

Projecting to completion of ongoing mine countermeasures platforms and equipment programs, the U.S. surface mine countermeasures posture will increase [deleted] in the near future.

The most significant shortfall [deleted]. As with surface mine countermeasures, airborne mine countermeasures will significantly benefit from the new helo platform and equipment that are under way. I believe that our airborne mine countermeasures capability [deleted] with the introduction of these new systems.

However, we will still have shortfalls in both surface and airborne mine countermeasures. The most significant of these shortfalls are listed on this slide.

MINE COUNTERMEASURES ASSESSMENT (CONT.)

Shortfalls:
Need modern sweep gear for the new mine countermeasures ships.
[Deleted.]
[Deleted.]
[Deleted.]
Allied technology being investigated to resolve some of these shortfalls.

Modern sweep gear remains to be developed, although some progress is being made by the United Kingdom with their OSBORN acoustic sweep and through our work on new deep mechanical sweep gear. We are investigating the OSBORN through the NATO comparative test program.

[Deleted.] Some work [deleted] is under way in the exploration and development area, 6.2, but more advanced development effort needs to be initiated.

Senator McCAIN [presiding]. Admiral, could I interrupt you a second? Could you give me a scenario of a place and what kind of mine [deleted].

Admiral KLEE. Yes, sir. Any mine [deleted] if [deleted] conditions [deleted] have significant movement [deleted].

Senator McCAIN. Where could we anticipate something like that—[deleted] a coastal area?

Admiral KLEE. Senator, I cannot off the top of my head answer that question right now, but I will take it for the record. But there are numerous parts of the world where this occurs. We have tested it off Panama City in Florida and various areas in which it occurs down there just to test to see how long it would take [deleted].

[The information follows:]

MINE WARFARE PROGRAMS

Admiral KLEE. Many mineable shallow waters of the world [deleted].

Senator McCAIN. Thank you. Please continue.

Admiral KLEE. [Deleted] is also required to take the man out of the loop, so to speak. This requirement is being considered by [deleted].

Finally, there is an urgent requirement for a mine countermeasures capability [deleted].

MINE WARFARE PROCUREMENT STRATEGY

Introduce new mine countermeasures ships and mine countermeasures helicopter platforms.
Provide equipment for each platform.
Complete the U.S. mine family . . . develop the advanced sea mine.
Plan and initiate program to resolve out year shortfalls.
Utilize foreign equipment and expertise as much as possible.

Recognize that mine warfare has a very limited budget, and prioritize efforts accordingly.

MINE WARFARE PROCUREMENT STRATEGY

Major programs that are funded and underway.
Platforms:
  Mine countermeasures ship (open ocean) (MCM).
  Mine countermeasures ship (coastal) (MHC).
  Mine countermeasures helicopter (MH53E).
  Craft of opportunity (COOP).
Mines:
  Quickstrike.
  Submarine launched mobile mine (SLMM).
  Captor.
  Advanced sea mine (ASM).
  [Deleted.]
Surface MCM equipment:
  Minehunting sonar.
  Mine neutralization system.
  Precise integrated navigation system (PINS).
Air MCM equipment:
  Magnetic sweep sled.
  [Deleted.]
  Neutralization.
International efforts:
    Foreign weapon evaluation program.
    Versatile exercise mine (VEMS) (U.K.).
    Mine sensors (Italy, Germany).
    Action information organization system (U.K.).
    NATO comparative test program.
    OSBORN acoustic sweep (U.K.).
    Wire sweep monitor (U.K.).

PROCUREMENT STRATEGY

Having summarized where we are and where we are going, I will now briefly address the procurement strategy that we are following to achieve the level of mine warfare activity that I have projected and to resolve the shortfalls that I have identified.

Our overall procurement strategy is presented in this vugraph. Our top priority is introduction of an MCM-1, the MHC-51, the MH-53E platforms and their associated equipment. Second priority is completing our mine family by the joint U.S.-U.K. development and production of the advanced sea mine.

In addition, we intend to complete production of Captor, Quickstrike and the submarine-launched mobile mine to provide a thorough mining capability into the 21st century.

REPRESENTATIVE ADDITIONAL PROCUREMENT REQUIREMENTS

Improved Captor [deleted].
Improved SLMM [deleted].
[Deleted.]
[Deleted.]
[Deleted.]
Mine countermeasures [deleted].
New sweep gear [deleted] working with allies.

Our strategy must also include programmatic and financial plans for resolution of the many remaining shortfalls that I have identified. This slide summarizes the additional procurement requirements, presenting an indication of when development is likely to occur. I am presently producing operational requirements documents and program acquisition plans for most of these shortfalls in anticipation of subsequent budget requests and reviews.

My overall mine warfare procurement strategy is designed to provide an integrated thrust to the increase our mine warfare readiness within our funding constraints.

In short, mine warfare is an affordable warfare area which can effectively act as a force multiplier.

SUMMARY/CONCLUSIONS

Summary/conclusions:

Mine warfare is a key warfare area.

Affordable warefare area . . . can effectively act as a force multiplier.

History has proven mine warefare's role in sea control.

The U.S. and most of our allies are pursuing active, aggressive programs to improve mine warefare capabilities.

Much remains to be done.

Representing less than 1% of the Navy's TOA, mine warfare is striving to remain a key player in overall U.S. and allied naval war plans.

Funding stability required to successfully implement our mine warfare program.

History has proven this statement to be true. In addition, the substantial resources placed by other countries on mine warfare also substantiate the importance of this naval warfare area. Both the United States and our allies are pursuing aggressive mine warfare programs to resolve the many existing shortfalls, both from the platform and the equipment points of view.

Clearly, although much has been done and much is being done, much remains to be done. Our goal is to make it happen and I feel that we are succeeding. However, implementation of the program and goals that I have presented today can only occur with a reasonable level of funding stability so that we can intelligently prioritize our program to the Navy's and our allies' maximum benefit.

Mr. Chairman, that concludes my overview of mine warfare. I appreciate the opportunity to appear before you and familiarize you with these programs. I urge your continued and strong support for mine warfare as the warfare area that will help optimize the effect of our minimum defense dollars. Thank you, sir.

Senator MCCAIN. Thank you, Admiral.

I thank you for a very important presentation and a very informative one. As you know, Senator Exon has been very interested in this issue and has been a leader here in the Senate on trying to address what may be an area of our greatest shortcomings as far as ability to carry out our missions, particularly at sea. He had to go to a Budget Committee hearing. As you know, that is kind of a hot item right now. And he expects to be back shortly. He requested that I ask some questions.

I would like to start out by asking you what capabilities do the Soviets have in the area of submarine-launched mobile mines and how do their capabilities compare with our own?

Admiral KLEE. Yes, sir. [Deleted.] Our maximum range for our submarine-launched mobile mine [deleted]. We have a program to extend that range [deleted].

Senator MCCAIN. Does this indicate to you that they have been doing a lot more work in this area than we have?

Admiral KLEE. Not necessarily, sir.

Senator MCCAIN. Have they given it a high priority?

Admiral Klee. Our mine is a converted Mark-37 torpedo, so it was not built as a ground-up submarine-launched mine. It was a conversion.

Senator McCain. Do you have any indication as to the priority that the Soviets have given mine warfare?

Admiral Klee. I would say very high, sir.

Senator McCain. Higher than ours?

Admiral Klee. If we look at just the inventories, in the Soviet inventory it is in the neighborhood of 300,000 [deleted]. I think that sort of speaks for itself.

Senator McCain. Have we observed exercises of the Soviets where they have specifically had minelaying and minesweeping as part of their exercise?

Admiral Klee. Yes, sir. That is about the only way that we get any intelligence on Soviet mines. We probably have better intelligence on their torpedos and missiles because we can use telemetry and acoustic acquisition of their runs, whereas in mine warfare we generally observe exercises or read articles in various periodicals.

So for mines after 1960, we have less information than we would desire to have.

Senator McCain. Specifically what are some of the gaps in our knowledge of their capabilities?

Admiral Klee. If you will bear with me for a moment, Senator, I think I have some good tick marks on that. Some of the limitations are technical data on Soviet mines produced since the late 1960s, data on minelaying training activities of the submarines and surface ships, data on production and stockpile levels, information on Soviet research and development, information on the availability of minelaying platforms, their tactics, and ready times.

Senator McCain. Maybe I should have asked what we do know.

Admiral Klee. We certainly exploit any mines that we obtain from various sources from around the world. If you recall the Red Sea incident, the British did find a mine and they did take it back to the U.K. It was exploited both by the U.K. and the United States.

Senator McCain. Were they surprised at the state of the art?

Admiral Klee. Yes, sir, although it was about a 1960 or 1970 vintage model.

CAPTOR

Senator McCain. I would like to talk a little bit about the Captor for a few minutes. How effective is the Captor against the new quiet Soviet submarines?

Admiral Klee. Mr. Senator, I would like to turn that over to a real Captor expert, Captain Fred Farber, who was program manager for the Captor mine.

Senator McCain. Captain.

Captain Farber. [Deleted.]

The payload itself is active acoustic system—that is, the torpedo. So once it is set and fired, it will go into active homing and will go after the target.

As far as the future threat is concerned, which I think you are relating, and the quieting of that future threat, we are looking at improving the Captor weapon system by increasing its capability [deleted]. There presently is an operational requirement approved in the Pentagon and we have structured the program plan to improve [deleted] even against the quietest submarine of the future.

Senator **McCain**. Thank you.

Admiral, I understand that the theater commanders requested additional quantities of Captor mines and yet the budget does not include funds to continue this production line. Is that accurate, and how do you feel about it?

Admiral **Klee**. Yes, sir. I think if you totaled all the CINC requirements for Captor mines you would probably be in the neighborhood [deleted]. Our current IO or our current inventory objective [deleted]. The maritime strategy has evolved such that we are [deleted].

Senator **McCain**. Is it true that the Navy has identified additional tactical uses for Captor?

Admiral **Klee**. Yes, sir, and we have been doing [deleted] tests [deleted] and they have turned out quite well thus far and could require more advanced sea mines or Captor-type weapons.

Senator **McCain**. Is this the result of the tests [deleted] you are speaking of?

Admiral **Klee**. I saw the question [deleted]. I am not familiar with those particular exercises. I know that battle groups have done exercises [deleted]. I know the battle groups want to use Captor in a tactical exercise. I know that we are converting 10 Captor mines for tactical exercise use, but I am really not familiar with which exercise [deleted] you have reference to.

Senator **McCain**. Captain, what do you think is the most effective platform for laying mines? Obviously it depends upon the scenario.

Captain **Farber**. [Deleted.]

Senator **McCain**. Although we have invested a large amount of money in helicopters that have that capability, right?

Captain **Farber**. I am not aware of any investment in helicopters, into aircraft.

Senator **McCain**. For sweeping. I am sorry. We have invested a great deal of money in the Sea Stallion, is it?

Captain **Farber**. Yes.

Senator **McCain**. Are you concerned about the grounding of that aircraft?

Captain **Erny**. Yes, sir. While I am involved with program management, I am familiar with the aircraft and the grounding is due to the spur gear in the main transmission where the number two engine inputs to that. It is a bad gear which requires removal and inspection of that gear prior to release for flight. That is in the CH-53E, the Marine Corps green version, if you will. It is also the same transmission that will be used in the MH-53E, the mine countermeasures version of the H-53. However, that aircraft is still on the production line and removal and inspection of the transmission will occur on the production line. We are hoping that fix will occur prior to the delivery of the MH to the fleet.

Senator **McCain**. Did we sweep Haiphong and the Suez Canal exclusively with helicopters?

Captain **Erny**. No, sir. There were other surface craft involved. For instance, in the Red Sea, Italians, Egyptians, and Dutch were involved using surface mine countermeasures forces, as well as our HM airborne mine countermeasures forces. In the Haiphong and North Vietnamese waters we used Marine Corps H–53s, as well as the Navy H–53s, and our surface MSOs. I might add that that was the last time that we sort of marshaled all of our MSOs together for that exercise.

Senator **McCain**. How long did it take?

Captain **Erny**. In North Vietnam, totally over a period of about 3 months. However, that was not all minesweeping. There were times when the forces were pulled over the horizon for certain negotiations and we had to seek permission to reenter different areas. However, for the total time that we were deployed there, it was approximately 3 months—February to June, the May–June time frame.

If I can go back to your [deleted] question, Haiphong Harbor is an excellent [deleted]. Other areas that are conducive to mining are areas [deleted] and we have evidence [deleted] within our own continental shelf areas on the east and gulf coasts.

[Deleted] a very difficult problem for mine-clearing forces.

Senator **McCain**. I wonder if the staff has any further questions you would like to ask.

We will keep the record open for additional questions from other Members. I appreciate you all being here today. Perhaps the line of work that you are in, Admiral, is among the least appreciated but perhaps the most important when the guns begin to shoot. Hopefully Senator Exon and other Members of the committee will recognize the importance of the challenges that lie ahead, particularly, our reliance on the allies. I think your presentation is a little optimistic, but I understand why we have to rely to a large degree on our allies for cooperation in this effort.

Thank you again for being here today, and the hearing is concluded.

[Whereupon, at 3:55 p.m., the subcommittee adjourned, subject to the call of the Chair.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEARS 1988 AND 1989

WEDNESDAY, APRIL 1, 1987

U.S. SENATE,
SUBCOMMITTEE ON PROJECTION FORCES
AND REGIONAL DEFENSE,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

SPECIAL OPERATIONS FORCES (SOF)

The subcommittee met in open session, pursuant to notice, at 2 p.m. in room SR-232A, Russell Senate Office Building, Senator Edward M. Kennedy (chairman) presiding.

Present: Senators Kennedy, Nunn, Stennis, Shelby, Cohen, and McCain.

Staff present: Arnold L. Punaro, staff director; Romie L. Brownlee, deputy minority staff director; Jeffrey H. Smith, general counsel; Patrick A. Tucker, minority counsel; George K. Johnson, Jr., Ronald P. Kelly, James R. Locher III, Norman G. Mosher, Gordon G. Riggle, professional staff members; Russell C. Miller, research assistant; and Lori M. Jackson, staff assistant.

Also present: Gregory B. Craig and William J. Lynn, assistants to Senator Kennedy; Jeffery B. Subko, assistant to Senator Exon; Leon Fuerth, assistant to Senator Gore; Terrence Lynch, assistant to Senator Shelby; William J. Wight, assistant to Senator Warner; Christopher Mellon, assistant to Senator Cohen; and Patrick A. Putignano, assistant to Senator McCain.

OPENING STATEMENT OF SENATOR EDWARD M. KENNEDY, CHAIRMAN

Senator KENNEDY. The committee will come to order today.

The Subcommittee on Projection Forces and Regional Defense holds its first oversight hearing on Special Operations. The primary focus of this hearing will be on the implementation of last year's legislation authored by Senator Nunn and Senator Cohen mandating a restructuring and reorganizing of the United States' Special Operations Forces.

Another important topic will be the adequacy of the program proposals for Special Operations Airlift.

I hope that our witnesses will also feel free to address some more general questions about America's ability to deal sensibly with low intensity conflict in the Third World.

Before taking up the organizational questions of last year's reform, I would like to raise some of the issues that those reforms were intended to address.

Forty years ago George Kennan, then a young foreign service officer wrote a memorandum to the Secretary of State in which he pleaded for the maintenance of small, compact alert forces capable of delivering at short notice effective blows on limited theaters of operation far from our own shores.

When he wrote his memoirs 25 years later, Kennan said the American military very much disliked this idea. They abhored the concept of limited warfare and were addicted to doing things only in the most massive, ponderous, and unwieldy manner.

Today, 15 years later, despite and perhaps because of the Vietnam experience, there has been a resurgence of interest among a few American military experts in low intensity warfare and a greater willingness to explore Kennan's concept.

Low intensity warfare is a likely arena of future conflict for the American military.

Indeed, American military personnel are involved today in many conflicts around the world, as the tragic news from El Salvador this morning so sadly points out. Staff Sergeant Gregory Fornisas of the Special Forces was serving as a part of the United States Military Group in El Salvador when he was killed yesterday in a guerrilla attack on a Salvadoran military garrison.

This makes a total of six U.S. military personnel who have been killed in the war in El Salvador since 1980.

Conflict and revolution are likely to continue in the Third World. The disrupting effects of modernization and the impact of technology fuel inherent instability generated by political change.

To a greater or lesser degree, the interests of the United States are at stake in a number of Third World conflicts. Any one of those conflicts could suddenly lead to the active participation of U.S. combat forces.

The lesson of the past 25 years is that we do not deal wisely with such conflicts. We fail to protect our own interests effectively.

It would be a mistake, for example, to superimpose cold war concerns onto every Third World conflict; to view each instance of instability around the globe as part of some global U.S.-Soviet struggle.

To do so would inevitably exhaust our resources and expend good will on problems that may not implicate our most vital national interest.

Bernard Fall who had something to teach about Vietnam, if we had listened, made the observation many years ago, guerrilla warfare is nothing but a tactical appendage of a far vaster political contest, and no matter how expertly it is fought by competent and dedicated professionals, it cannot possibly make up for the absence of a political rationale.

Third World conflict is unique in that it centers more on political, social and economic concerns as the main battlefields, rather than on the clash of armed forces. In training our military to function in the context of Third World conflicts, we have been insensitive to such factors in the past. We have not paid enough attention to the importance of political infrastructures, civic action and psychological operations to meeting human needs and to accommodate radically different cultures and traditions.

Finally, the services' policies in the past have not encouraged the most able personnel to pursue Special Operations, and have actually hampered the development of expertise in low intensity operations.

Too frequently soldiers are rotated in and out of their units every couple of years, generating turmoil and retarding the development of the language and cultural expertise needed by men who should interact closely over a prolonged period of time with the population of a Third World nation.

Special Operations should not be a professional dead end for young officers. Promotions should be achievable at the same rates and the comparable levels of authority as are available to officers in other specialties.

Last year, Congress took action to eliminate organizational problems responsible for deficiencies in planning and preparing Special Operations Forces. We were concerned that the forces were fractured along service lines, and were incapable of unified action, received insufficient resources and were not integrated with planning and strategy.

To deal with these problems Congress mandated certain actions, including the creation of an Assistant Secretary of Defense for Special Operations and Low Intensity Conflict, the establishment of a unified command and the assignment of all Special Operations Forces stationed in the United States to this command, and the creation of a board for low intensity conflict within the National Security Council.

Today we want to find out what progress has been made over the past 5 months in implementing this important legislation.

Members of the committee are concerned that the Department of Defense has not been willing to carry out the congressional mandate. As a memorandum from Secretary Weinberger from the Special Operations Policy Advisory Group states, while we wish to make clear that we are not suggesting that OSD is participating in any manner in an obstructionist or delaying role in implementing the reorganization, we believe that outsiders could reasonably draw this conclusion.

I want to welcome and introduce our first witnesses, Hon. Richard Armitage, the Assistant Secretary of Defense for International Security Affairs, and Maj. Gen. T.W. Kelly, the Director of the Joint Special Operations Agency, Joint Staff.

Before we hear the opening statements of our witness, I would like to yield to Senator Cohen for any comments he wants to make.

In the way of introduction I commend Senator Cohen for the leadership that he has shown on this issue since he has been a member of the Armed Services Committee, his interest and his work are well known to all the members of the committee I am sure, and we will look forward to whatever comments he would like to make.

Senator COHEN. Thank you very much, Mr. Chairman.

I will be brief and ask that my statement appear in full in the record and just offer a couple of observations.

You quoted from George Kennan some years ago, and frankly I was going to quote someone you are familiar with, that is President Kennedy about 30 years ago.

He said that our nuclear power cannot deter Communist aggression which is too limited to justify atomic war. It cannot protect uncommitted nations against a Communist takeover using local or guerrilla forces. And so, ironically, we find ourselves in the situation that with all the expense and sophistication of our nuclear deterrent, which has in fact successfully deterred overt Soviet aggression since World War II, we are nevertheless impotent when it comes to deterring the type of conflict we are most likely to face in the coming decades.

It is clear to me, that despite your brother's efforts, we still have not come to grips with the challenges that are posed by terrorism and guerrilla insurgencies.

I think that is evident from an examination of our military track record, the testimony of current and former military and civilian Defense Department officials, and a recent inter-agency study of low-intensity conflict, which concluded as follows: "Our current defense posture reflects our inability to understand the form and substance of this direct challenge to our interests. Our lack of understanding is manifested in a lack of unity of effort, lack of doctrine, training, organizations and materiel to execute operations and a lack of sustaining support system. Short of war, we have no strategy or comprehensive plan to address the challenges of political violence."

That is a pretty strong indictment that was issued by that interagency study.

Frankly, when Senator Nunn and I discussed this last year, we were tempted to submit a nonbinding piece of legislation. But it became apparent to us, given the kind of intrasigence that we detected within the Department of Defense, that we had to make it mandatory. Indeed, since that time, the decision appears to be correct in my judgment. There continues to be opposition manifested within the Department of Defense.

We are now, 5 months later, without even a nominee for the Assistant Secretary of Defense position. We are being held hostage by the Secretary of Defense saying we cannot create this position mandated by Congress until you lift the ceiling on the defense reorganization.

We have proposed a command center that will now be located down in Florida rather than the Washington area. We have a situation where the Assistant Secretary of Defense for this matter would be located outside of the Pentagon. With all of the room that should be available in that building, I am told he will not even have an office inside that building.

So I am troubled by not only the people who are coming to me from the military, but those who have served in military, and civilians as well, that this is another attempt on the part of the Pentagon to resist to the utmost the implementation of this legislation. So I welcome the opportunity to hear from Mr. Secretary Armitage and Major General Kelly.

[The prepared statement of Senator Cohen follows:]

PREPARED STATEMENT BY SENATOR WILLIAM S. COHEN

I would like to join the chairman in extending a welcome to our witnesses today. I am looking forward to hearing your testimony—particularly with regard to the implementation of the Cohen-Nunn bill on special operations forces and low-intensity conflict.

This topic does not involve any big ticket items or glamorous technologies, but it does have a critical bearing on our national security interests—particularly in the volatile Third World, which comprises roughly two-thirds of the world's land-mass and is home to three-quarters of its population. President Kennedy identified the crux of the problem nearly 30 years ago when he said, "Our nuclear power cannot deter Communist aggression which is too limited to justify atomic war. It cannot protect uncommitted nations against a Communist takeover using local or guerrilla forces." Ironically, for all their expense and sophistication, the forces which have successfully deterred overt Soviet aggression since World War II are impotent when it comes to deterring terrorists and guerrillas.

It is clear that the United States has not yet come to grips with the challenges posed by terrorism and guerrilla insurgencies. This is evident from an examination of our military track record, the testimony of current and former military and civilian Defense Department officials, and a recent interagency study of low-intensity conflict which concluded:

"Our current defense posture reflects our inability to understand the form and substance of this direct challenge to our interests. Our lack of understanding is manifested in a lack of unity of effort; lack of doctrine, training, *organizations* and materiel to execute operations; and lack of a sustaining support system. *Short of war, we have no strategy or comprehensive plan to address the challenges of political violence."* (emphasis added)

Originally it was my intent, and I know that of Senator Nunn, to offer non-binding legislation, in the hope that voluntary action would be taken by the administration to establish a high-level focus on special operations and low-intensity conflict. It became clear through time, however, that Department of Defense opposition to necessary reforms was so deeply entrenched that in the absence of legislation it would soon be "business as usual" in the Pentagon. This conclusion was reinforced not only by the testimony received, but by the history of previous non-legislative attempts at reform: President Kennedy tried but failed from the Oval Office; General Meyer tried to move the military from within, only to experience similar frustration.

It has now been 5 months since the enactment of this legislation. Based on a "progress" report delivered to Congress last month, I and other Members of Congress have expressed concern regarding the pace and direction of the Pentagon's response to its mandate from Congress. Similar concerns have also been expressed by members of the Secretary of Defense's advisory group for special operations as well as some active duty military officers who have contacted me privately. I know that our witnesses today are aware of these concerns and I look forward to their testimony.

My hope for this legislation is that, if properly implemented and supported, it will enable us to avoid repeating the costly errors of the past by:

(1) Providing close civilian oversight for low-intensity conflict activities;

(2) Ensuring that genuine expertise and a diversity of views are available to the National Command Authorities regarding possible responses to low-intensity conflict threats;

(3) Improving interagency planning and coordination for low-intensity conflict; and

(4) Bolstering U.S. special operations capabilities in a number of areas, including: joint doctrine and training, intelligence support, command and control, budgetary authority, personnel management, and planning.

It is against these objectives that I believe we will have to judge the current proposals for implementing the provisions of the legislation enacted last fall.

Senator KENNEDY. Mr. Secretary.

STATEMENT OF RICHARD L. ARMITAGE, ASSISTANT SECRETARY OF DEFENSE FOR INTERNATIONAL SECURITY AFFAIRS

Mr. ARMITAGE. Mr. Chairman, thank you very much. Senator Cohen, it is good to be with you, and I trust if you have not had the opportunity to read our submitted questions that you will have some of your questions changed after you have read them. There is a bit of misinformation existing and I would like the opportunity to put the record straight.

[Submitted questions for the record follow:]

ADVANCE QUESTIONS AND ANSWERS SUBMITTED BY SECRETARY ARMITAGE ON SPECIAL OPERATIONS FORCES

Question. In specifying the position of Assistant Secretary of Defense for Special Operations and Low-Intensity Conflict, the Congress fully intended that one of the eleven authorized Assistant Secretary positions would be used for this purpose. The conference committee explicity rejected the option of authorizing a twelfth Assistant Secretary. Yet, the Secretary of Defense Report to Congress on Special Operations Reorganization states that the position of Assistant Secretary of Defense for Special Operations and Low-Intensity Conflict will not be created until a twelfth Assistant Secretary is authorized. Why has the Department of Defense refused to comply with the law?

Answer. In the 20 February Secretary of Defense Report to Congress on Special Operations Reorganization the intent of the Department of Defense was to ask for relief from the SOF reorganization legislation by requesting that Congress amend Title 10 to authorize a twelfth ASD because the other eleven ASD positions are encumbered or designated. We have been proceeding with the selection process on the assumption that our candidate will be nominated and his office functioning within the time specified in the SOF reorganization legislation. We will make whatever arrangements are necessary to ensure that this is done. The request for an additional ASD was included to elicit assistance from Congress on a matter that is quite difficult for us—namely the disestablishment of one of our long standing and functionally important ASDs.

Question. In testimony last year, Admiral Crowe and Secretary Armitage argued convincingly that the then-called Special Operations Forces Command should be located in the Washington Headquarters area. However, the Secretary's report indicates that the U.S. Special Operations Command will be located at MacDill Air Force Base, Florida. (a) How will the coordination and control benefits of a Washington location that Admiral Crowe and Secretary Armitage foresaw be retained if the command is located in Florida? (b) If the U.S. Special Operations Command is located at MacDill Air Force Base, will it have a Washington Liaison Office?

Answer. (a) The coordination and control benefits alluded to by Admiral Crowe and Mr. Armitage were based upon a different command concept. Thus, relationships described were couched in terms of a 3-star commander responding to the needs of the Chairman, Joint Chiefs of Staff, who was to serve as the principal military advocate for SOF. The office of the ASD(SO/LIC), which is being formed under the provisions of the SOF reorganization legislation, will perform much of the Washington area coordination for Special Operations matters. For those matters that are primarily operational in nature that are time sensitive, it is planned that CINCSOC will have representatives permanently assigned in Washington. No other CINC has this arrangement to assist in the fulfillment of his mission.

(b) Yes, there will be a Washington Liaison Office.

Question. (a) Why was MacDill Air Force Base selected as the location for the headquarters of the U.S. Special Operations Command? (b) What locations within the Washington headquarters area were considered? (c) Why were these locations rejected? (d) What were the costs of locating the headquarters area compared to costs of using MacDill Air Force Base?

Answer. (a) In our search for a location for USSOC, disestablishing USREDCOM, and thereby using existing facilities at MacDill AFB, became a logical option. The proposed transfer of the Joint Deployment Agency and its related functions to the recommended new Unified Transportation Command severely reduced USREDCOM's role within the unified command structure. Thus, by reassigning the remaining USREDCOM mission and functions to other commands and agencies, a net manpower savings could be realized. This, in conjunction with the availability of outstanding facilities, would save us $60 million in installation costs alone.

Another compelling factor considered was the time that would be saved by moving into existing facilities and the importance of having world wide command, control, communications, and intelligence (C^{3}I) channels already in place. To move into temporary facilities for a period of one to two years would severely inhibit establishing the C^{3}I nodes so critical to USCINCSOC's mission.

Finally, the fact that MacDill has such a substantial airfield complex means that operational forces could be flown in or out on short notice and that USCINCSOC could be in Washington in two hours flying time if he were needed in times of crisis.

(b) The other locations considered in the Washington, D.C. area were Fort Meade, Fort Belvoir, Vint Hill Farms, Andrews AFB, Buzzard's Point, and Bolling AFB.

(c) These other locations were rejected because in each case there were no available facilities for the USSOC and military construction funds would have been required to support a permanent site for the command.

(d) Cost comparisons between MacDill AFB and a command based in Washington were never generated for the construction requirements at each site. Recognizing the space and security requirements for a headquarters facility, it was apparent that construction costs for the projected USSOC command facility would exceed $60 million. Thus, MacDill AFB seemed to be a better option.

Question. Neither psychological operations nor civil affairs were mentioned in the Secretary of Defense Report to Congress on Special Operations Reorganization. Each is described as a special operations activity in Section 167 of Title 10. (a) Why were these activities not mentioned in the Secretary of Defense's report? (b) Will all active and reserve psychological operations and civil affairs forces stationed in the United States be assigned to the U.S. Special Operations Command?

Answer. (a) Psychological Operations and Civil Affairs were not included in the 20 February Secretary of Defense Report to Congress on Special Operations Reorganization because a more thorough review was required. The Joint Chiefs of Staff did include Psychological Operations and Civil Affairs in their 18 March 1987 recommendations to the Secretary of Defense on the establishment of the U.S. Special Operations Command, and a decision is expected shortly.

(b) The JCS has recommended that active and reserve Psychological Operations and Civil Affairs units be included within the new unified command. The Secretary of Defense, however, is still reviewing the issue. In 1985, OSD conducted a study and developed a master plan to revitalize and overcome deficiencies in our Psychological Operations capabilities. Some of the provisions of that plan have been set in motion and are now impacted by the SOF reorganization legislation. We are reexamining these deeply interrelated issues and expect a determination soon.

Question. (a) Why will the Naval Special Warfare Groups be assigned to the U.S. Atlantic and Pacific Commands in lieu of the U.S. Special Operations Command? (b) How does this decision promote a unified approach to planning and preparation for special operations?

Answer. (a) The JCS recommended that the Naval Special Warfare Groups be assigned to USPACOM and USLANTCOM in recognition of the special relationship with those unified commands. Additionally, this recommendation is in concert with the conferees' joint explanatory statement that accompanied the SOF reorganization legislation. This statement indicated that the conferees believed that Naval Special Warfare units now assigned to the Pacific and Atlantic commands should continue to be assigned to those commands.

(b) The decision to leave Naval Special Warfare Groups assigned to USLANTCOM and USPACOM still promotes a unified approach to planning by keeping the special operations activity under the command of the unified commander in whose geographic area the mission or activity is to be conducted, unless otherwise directed by the President or the Secretary of Defense. Since the Naval Special Warfare Groups will most likely be employed in the Atlantic or Pacific commands' areas, their assignments to those areas will promote a unified approach to planning and preparing for special operations in those regions.

Question. (a) What Special Operations Forces capabilities are being developed by the U.S. Marine Corps? (b) How will these forces relate to the U.S. Special Operations Command?

Answer. (a) The U.S. Marine Corps does not possess any Special Operations Forces and the USSOC will not have any Marine Corps units assigned. The Marine Corps, however, is currently developing limited special operations skills in its Marine Amphibious Unit (Special Operations Capable) or MAU(SOC). This program utilizes forward deployed conventional amphibious units and combines enhanced night capabilities with conventional helicopter assault operations to handle in extremis situations where other SOF are not available.

(b) These forces will have no relationship to the USSOC.

Question. (a) How does the 250-man headquarters staff of the U.S. Special Operations Command compare with the size of other unified and specified command headquarters staffs? (b) How will military positions on the headquarters staff of U.S. Special Operations Command be allocated among personnel from the four Services?

Answer. (a) The headquarters for USSOC is initially authorized 250 personnel with a projected growth in FY 1988 to 306 and to 446 in FY 1989. Additionally, the commander-in-chief, USSOC, will have the opportunity to review and recommend increases in manpower should he deem it necessary. As a point of comparison, RDJTF/USCENTCOM began with 250 personnel, took four years to be established and now has 903 personnel. Current strengths of the other unified commands are:

USREDCOM—464, USLANTCOM—370, USPACOM—689, USSOUTHCOM—358, and USEUCOM—655. USSPACECOM started with 302 and USTRANSCOM will begin with 192 with an expected growth to 388.

(b) The allocation of positions within USSOC Headquarters will be developed in concert with the mission and functions of the command. The command will require balanced representation from all Services to prepare and fully integrate an individual Service's SOF into a joint force, develop a joint SOF strategy, and ensure that joint training, doctrine, and resources are properly addressed.

Question. Last year, the Joint Chiefs of Staff proposal envisioned that the headquarters staff of the Special Operations Forces Command would have an augmentation team of 8–10 members for each unified combatant command with SOF missions. Will the U.S. Special Operations Command have such augmentation teams?

Answer. This issue has not yet been determined. It will depend on whether theater Special Operations Commands are designated as staff functions or sub-unified commands of the theater CINCs. The final decision on this issue will rest with USCINCSOC in consultation with the five regional theater CINCs.

Question. (a) How many personnel will be assigned to the Office of the Assistant Secretary of Defense for Special Operations and Low-Intensity Conflict? (b) How does this staff size compare with the offices of other Assistant Secretaries of Defense?

Answer. (a) The initial size of the ASD (SO/LIC) organization will be 54. This group will form the nucleus of the new organization. Once the new Assistant Secretary for SO/LIC is approved and on board, the organization may expand as necessary to accomplish the mission outlined in the SOF reorganization legislation.

(b) Other ASDs vary in size by virtue of their charter and responsibilities. It is difficult, therefore, to contrast and compare existing ASD staffs that already have established charters and clearly identifiable responsibilities to one that is still in its nascent stages and has not been completely fleshed out. For purposes of numerical comparison, however, on the low side, one of the ASDs has 44 assigned, while on the high side, one ASD has approximately 200.

Question. (a) What progress has been made in implementing those portions of the reorganization legislation dealing with low-intensity conflict? (b) How will the Assistant Secretary of Defense for Special Operations and Low-Intensity Conflict carry out his responsibilities in this area? (c) Has the Board for Low-Intensity Conflict been established within the National Security Council? (d) Has the President designated a Deputy Assistant to the President for National Security Affairs for Low-Intensity Conflict?

Answer. (a) A position for a Deputy Assistant Secretary of Defense for Low-Intensity Conflict [DASD(LIC)] will be created under the ASD(SO/LIC) with a specific charter to deal with LIC concerns and programs.

(b) The ASD(SO/LIC) will be kept abreast of progress and problems in the LIC arena through the DASD(LIC) and his staff. Advocacy for LIC programs and the resolution of problem areas will be handled through normal command and control mechanisms in coordination with the Under Secretary of Defense for Policy and the Secretary of Defense.

(c) We recommend that you refer this question to the National Security Council.

(d) We recommend that you refer this question to the White House.

Question. (a) What are the major differences between the currently proposed plan for SOF airlift and the plan submitted to the Congress on April 1, 1986? (b) What is the justification for these differences?

Answer. (a) The major differences between the currently proposed plan for SOF airlift and the plan submitted to Congress on 1 April 1986 are as follows:

(1) The 1 Apr 86 plan provided the total number of SOF aircraft to meet the global wartime requirements of all five regional CINC's simultaneously. The currently proposed SOF Airlift Plan provides the number of aircraft necessary to meet the simultaneous requirements of the three regional CINCs directly responsible for conflicts involving the Soviet Union plus one-half of the aircraft necessary for a simultaneous war in USSOUTHCOM's area of operations. In peacetime, the proposed force could also meet the worst regional war scenario in any CINC's theater of opertion plus the worst case JSOC scenario simultaneously.

(2) The 1 Apr 86 plan was based upon providing the maximum capable aircraft regardless of threat. The currently proposed plan throughly reviewed targets and threats by theater and used less sophisticated aircraft where possible.

(3) The 1 Apr 86 plan cost $5.3 billion above the original Defense Budget projections, was based primarily on a strategy of new procurements for acquisition, and provided 100 percent of the SOF airlift required for a 5-CINC simultaneous global war. The currently proposed plan costs $1.6 billion above the original Defense

Budget projections, is based on a strategy of modifying existing aircraft and dual-hatting aircraft (e.g., C-141 and C-130 SOLL II and HC-130 Tankers) to do more than one mission, and provides 97 percent of SOF airlift capability identified in the 1 Apr 86 Report to Congress. In other words, the current plan provides 97 percent of the SOF airlift capability identified in the 1 Apr 86 report for only 25 percent of the cost increase. In terms of total program costs (including SOF airlift programs already in the Defense Budget), the current plan costs only about two-thirds as much as the 1 Apr 86 plan.

(b) These differences are justified because we get nearly the same SOF airlift capability at a cost savings of more than $3.0 billion. Additionally, they are in consonance with our national strategy for conventional forces to defend certain theaters of operation according to priorities assigned by the National Command Authority. Finally, except for CV-22s which cannot be procured more quickly due to developmental parameters, they will allow us to field the majority of our SOF airlift aircraft (i.e., put rubber-on-the-ramp) two years ahead of the program schedule driven by our 1 Apr 86 report.

Question. How does the objective of simultaneously meeting the Special Operations Forces airlift requirements of only three unified combatant commands relate to U.S. military strategy?

Answer. With guidance from the National Command Authority, we have assigned priorities to certain theaters of operation and plan to allocate our finite forces according to the priorities that have been established. The revised SOF airlift force structure is in consonance with our conventional force structure strategy in assigning priorities for the finite number of defense weapon systems to certain theaters of operations.

Additionally, the currently proposed SOF Airlift Plan provides forces for simultaneous employment in either three and one-half theaters of operation in wartime or the worst case regional war plus the worst case JSOC contingency in peacetime.

Question. What is the status of initiative #17 (Rotary-Wing Lift Support for Special Operations Forces) of the Memorandum of Agreement on U.S. Army-U.S. Air Force Joint Force Development Process of May 22, 1984?

Answer. Implementation of Initiative 17 is underway. The Chiefs of Staff of the Army and Air Force, the Chairman, Joint Chiefs of Staff, and the Secretary of Defense agreed to the SOF force structure requirements that were forwarded to Congress in our FY 1988 Defense Budget request. This force structure is in consonance with the FY 1987 Authorization legislation and assures that the Army and Air Force will share the SOF rotary-wing mission responsibilities for the indefinite future. The Air Force will continue to modify its H-53s to Pave Low III Enhanced configuration and the Army will begin their research and development efforts on the MH-47E and MH-60K. The Army will assume the full SOF rotary-wing mission when they are operationally capable of doing so.

Question. What changes in funding would be required in Fiscal Years 1988 and 1989 if the Fiscal Year 1987 supplemental authorization request for SOF airlift were not approved?

Answer. If the fiscal year 1987 Supplemental request is not approved, each Air Force SOF program would need its respective fiscal year 1988 funding increased by the fiscal year 1987 Supplemental amount ($329.4 million) plus inflation. Additional funds (to be determined) due to renegotiation of the MC-130H, AC-130U, and CV-22 contracts would need to be added.

The program most severely impacted would be the MH-53J. It would experience a schedule impact of up to two years for the shipboard compatibility modification with an associated cost increase of $20.0 to $30.0 million. We need to point out, though, that the impact of not funding the FY 1987 Supplemental is more severe than just increased costs. Program schedules will slip and the Department will not be able to comply with Section 156 of the FY 1986 Authorization Bill to revitalize Special Operations Forces by 1991.

Question. How many active general and flag officers have served in special operations duty assignments? Would you provide a list of these officers by name, Service, and years of special operations duty experience?

Answer. See the attached 3-page list of general and flag officers following the answer to Question 17.

Question. Section 113 of Title 10 requires the Secretary of Defense to inform the President of the qualifications needed in an office to be filled by a person appointed from civilian life by the President, by and with the advice and consent of the Senate. What qualifications has Secretary Weinberger specified for the Assistant Secretary of Defense for Special Operations and Low-Intensity Conflict?

Answer. The ASD (SO/LIC) must have the ability to meet four main challenges. First, is to improve the employment philosophy of our Special Operations Forces and revise our low-intensity conflict approach as necessary. Second, is to guide the reorganization of our SOF in their relationships with their parent Services and the joint arena. Third, to represent Special Operations and low-intensity conflict in the interagency and international arena in a manner that properly employs this important, but little understood, instrument of national policy. Lastly, to have an effective understanding and experience in the interrelationships between OSD, JCS, the Services, and other Defense Agencies; the Programming, Planning, and Budgeting System (PPBS); the functions of the Defense Reosurces Board (DRB); and in the interagency political/military community at senior levels. These challenges encompass a broad range of skills, experience, and statute and are being considered in depth by the Secretary of Defense in selecting a candidate for this important position.

Question. When can the Senate expect to receive the nominations of the Assistant Secretary of Defense for Special Operations and Low-Intensity Conflict and the Commander-in-Chief of the U.S. Special Operations Command?

Answer. Recommendations to the President for the USCINCSOC and the ASD (SO/LIC) will be forthcoming very soon and will be within the congressionally-mandated timeframe (i.e., not later than 16 April).

GENERAL OFFICERS WITH SPECIAL OPERATIONS EXPERIENCE

Name	Rank	Years
Army:		
Lindsay, James J.	General	7
Bethke, Gerald	Major General	4
Corns, Jonnie H.	Major General	3
Crysel, James W.	Major General	4
Hugo, Victor J., Jr.	Major General	2
Jolemore, Kenneth A.	Major General	1
Kelly, Thomas W.	Major General	1
Leuer, Kenneth C.	Major General	2
Luck, Gary E.	Major General	3
Lutz, Joseph C.	Major General	8
Stiner, Carl W.	Major General	7
Suddath, Leroy	Major General	3
Wagner, Robert E.	Major General	3
Wiegand, Robert D.	Major General	3
Boice, Craig H.	Brigadier General	2
Downing, Wayne	Brigadier General	8
Fields, Harold T.	Brigadier General	2
Getz, Charles E.	Brigadier General	4
Guest, James	Brigadier General	14
Hennies, Clyde	Brigadier General	2
Loeffke, Bernard	Brigadier General	2
Owens, Ira C.	Brigadier General	8
Spigelmire, Michael	Brigadier General	5
Williford, Sherman	Brigadier General	4
Henry, Terence M.	Colonel (P)	3
Scholes, Edison E.	Colonel (P)	6
Scott, James Terry	Colonel (P)	2
Shachnow, Sidney	Colonel (P)	9
Sottak, Barry J.	Colonel (P)	3
Piotrowski, John L.	General	4
Casey, Aloysius G.	Lieutenant General	1
Goodall, Harry A.	Lieutenant General	1
Hansen, Alfred G.	Lieutenant General	1
Springer, Robert D.	Lieutenant General	5
Watts, Claudius E., III	Lieutenant General	1
Callahan, James T.	Major General	5
Cassity, James S., Jr.	Major General	3
Cox, Hugh L., III	Major General	3
Dugan, Michael J.	Major General	1
Farris, Jack K.	Major General	1

GENERAL OFFICERS WITH SPECIAL OPERATIONS EXPERIENCE—Continued

Name	Rank	Years
Forgan, David W.	Major General	2
Fornell, Gordon E.	Major General	3
Goetze, Richard B., Jr.	Major General	1
Haeffner, Fred A.	Major General	1
Jefferson, Wayne O., Jr.	Major General	1
Pascoe, Richard M.	Major General	3
Patterson, Robert B.	Major General	2
Rees, Clifford H., Jr.	Major General	2
Sheppard, Jack W.	Major General	1
Stihl, John T.	Major General	1
Trzaskoma, Richard J.	Major General	1
Andrus, James G.	Brigadier General	2
Hargrove, Floyd E.	Brigadier General	1
Jamerson, James L.	Brigadier General	1
Johnston, James M., III	Brigadier General	4
Kelly, Frank K., Jr.	Brigadier General	2
Loy, Noah E.	Brigadier General	1
Marquette, Robert M., Jr.	Brigadier General	1
Porter, William J.	Brigadier General	1
Rhodes, James M., Jr.	Brigadier General	1
Scofield, Richard M.	Brigadier General	1
Scott, Hanson L.	Brigadier General	2
Stoner, Richard L.	Brigadier General	1
Studer, William A.	Brigadier General	5
Van Inwegen, Earl S.	Brigadier General	1
Webb, Walter E., III	Brigadier General	1
Williams, William T., IV	Brigadier General	1
Navy:		
Flynn, Cathal L.	Rear Admiral	20
Dorman, Craig E.	Rear Admiral	7
LeMoyne, Irve C.	Rear Admiral (SEL)	20
Marine Corps:		
Rice, Wesley H.	Major General	8
Beans, James	Brigadier General	3

Mr. ARMITAGE. I realize, however, that the patience of the subcommittee is in inverse proportion to the length of my opening statement, and so I would like to submit my opening statement and just make a few off the cuff remarks following the lead of Senator Cohen if I may.

Senator KENNEDY. Your statement will be printed in its entirety. All the statements will be.

Mr. ARMITAGE. Thank you, Mr. Chairman.

It is quite apparent to the Pentagon that money is not the problem. Money at one time in SOF was the problem. The administration came aboard in 1981. All of the SOF budgets for all the services totalled $440 million. In 1988 our proposal is for $2.5 billion for all of SOF. And indeed, our 5-year fiscal year 1988 through fiscal year 1992 procurement plans have a total of $10.5 billion devoted to Special Operating Forces needs.

I might add, as you mentioned Mr. Chairman, $6.8 billion of those dollars are devoted to the airlift question. But the problem, as we have all recognized is not one of money, it is, as you have suggested, one of organization. We attempted in hearings last year, Admiral Crowe and myself, to plead with the subcommittee to allow us to try to rectify this ourselves. You indeed saw fit however to legislate and we respect that decision. I think after my comments today, at least after our presentation today you will agree that we have perhaps made more progress than has heretofore been apparent.

Regarding the Assistant Secretary of Defense, the Secretary of Defense sent an interim report to certain committee members, and I wish frankly that we had an opportunity to rewrite the letter. Because if you read it carefully there are conflicting statements in one of the opening paragraphs. We say we shall establish the Assistant Secretary for SO/LIC. In a subsequent paragraph we say, as the Senator from Maine suggests, that we want relief from the Title X restrictions of 11 ASDs.

I want to clarify this. I know it was clarified for staff immediately after the letter was submitted. But the Secretary of Defense fully intends to nominate an Assistant Secretary of Defense and to put him in place. If we have to take away another Assistant Secretary of Defense from somebody, we shall do it.

As you know, Title X does limit us to 11. We would request support for a twelfth ASD. We think it is unfair to strip someone who is now sitting as an ASD from that position for something that he did not deserve and give it to somebody else. But if that is what the committee wants to do, we shall do it, and that is very clear.

Senator COHEN. Richard Perle is leaving office soon. [Laughter.]

No, I am serious. He is leaving office soon. I have looked at the books, I cannot find anything in law that creates that Assistant Secretary position.

Wouldn't you think it would make more sense to comply with the mandate of Congress as opposed to something that is not in law?

Mr. ARMITAGE. We are going to comply with the mandate of Congress, I assure you. Richard has a few days left on his contract. I would not dare take away his Assistant Secretaryship while he is still breathing in the Department but we will take it if necessary from somebody.

The Secretary has told me that this morning and we have so responded to your questions. It is not our intent to hold things up until we get a twelfth ASD. That nomination process has been quite exhaustive. The Deputy Secretary of Defense interviewed nine individuals, several of whom were suggested by the members of the Senate or the House, several of whom were generated through the Presidential personnel system. A few were walk ins. That was whittled down to four interviewees for the Secretary of Defense.

He completed his fourth and final interview this morning. He has authorized me to tell you within the next few days his recommendation will be forwarded to the President for the position of ASD SO/LIC, and hopefully if it meets with the President's approval it will be forwarded to the Senate for advice and consent.

Regarding the location——

Senator KENNEDY. Can you tell us anything more about that? Has that person been recently in the military or is he a civilian?

Mr. ARMITAGE. All of the people who were interviewed by the Secretary of Defense were either recently in the military or on active duty now.

However, anyone who is chosen for the position or recommended by the Secretary would have to be a civilian, and so active duty military would have to retire.

Senator COHEN. Could you tell us what criteria you were looking at?

Mr. ARMITAGE. Yes. Do you mind if I go through the several items, then I would be glad to hit all of those?

With respect to the commander of U.S. Special Operations Command, a recommendation is being forwarded to the President. We await the public announcement of that nomination from the White House.

Regarding the Assistant Secretary and the size of his operation, this has been the subject of some debate. The Assistant Secretary of Defense will be located in the Pentagon on the E-ring just like all of the other Assistant Secretaries.

Senator COHEN. What about his staff?

Mr. ARMITAGE. His staff, particularly counterterrorism and Special Operations staff members will of necessity have to be located with him. The others, unfortunately, will temporarily be located in Rosslyn. It is our intention eventually to move them all to the Pentagon.

Another item concerned the size of the ASD's staff.

The Deputy Secretary of Defense has settled on an initial limit of 54 people for his staff. Three Deputy Assistant Secretaries, one Principle Deputy and another 50 staff members.

I want to emphasize that this is an initial position and had been so stated in my prepared responses to your questions.

Should the Assistant Secretary for SO/LIC determine that more people are necessary, the Deputy Secretary has indicated that he will entertain the proposal.

I think this is in somewhat dramatic contrast to the building as a whole, which has been required or has been mandated to reduce by 10 percent its staffing over the next 2 years.

Regarding the location of the command, we did choose MacDill in Tampa. This is not quite the end of the earth that some would make it, at least to our friends in Florida.

Senator COHEN. But you can see it from there, can't you? [Laughter.]

Mr. ARMITAGE. I think the Florida delegation will be back to you on that, sir. [Laughter.]

But I would like to emphasize why we made this decision. It comes down to three things: money, time, and existing facilities. We estimate that at least $60 million in military construction funds are saved by not having to construct any more facilities. We would note that in terms of communication, both the worldwide communication net is existent, as well as an airfield to serve all of our aircraft, and finally time. I believe the Joint Chiefs of Staff representative, General Kelly, can explain to you far more competently than I that it is their estimate that approximately 2 years would be involved in setting up a new command and new facilities. These facilities already exist in REDCOM.

There will, however, be a liaison office in the Pentagon. A decision has been reached in consultation between the Chairman and the Secretary of Defense. And the size of that liaison office will await the commander's judgment on what he thinks is necessary to do the job.

Finally, Senator Kennedy and Senator Cohen, allow me to talk a bit about major force Program 11. You may have been aware of a recent directive by the Deputy Secretary of Defense which clearly and unambiguously states that all SOF unique funding will be included in major force Program 11. And this most definitely does include SOF aircraft, naval special warfare forces, and JSOC, as well as all the service programs contained in the December 17, 1985, Annex to the JSCPE.

Senator Kennedy mentioned low intensity conflict, and I had in mind today to try to get on the record what we have wrestled with in coming up with a definition of low intensity conflict. If you will indulge me just a moment longer, I would like to submit this for the record.

A low intensity conflict is a political-military confrontation between contending states or groups below conventional war and above the routine peaceful competition among states. It involves protracted struggles of competing principles and ideologies.

Low intensity conflict ranges from subversion to the use of armed force, and it is waged by a combination of means, employing political, economic, informational and military instruments.

Low intensity conflicts are often localized, generally in the Third World, but contain regional and global security implications.

I thank you very much Mr. Chairman and Senator Cohen, and would be glad to try to respond to your questions.

[The prepared statement of Richard Armitage follows:]

STATEMENT BY
HONORABLE RICHARD L. ARMITAGE
ASSISTANT SECRETARY OF DEFENSE
FOR INTERNATIONAL SECURITY AFFAIRS

INTRODUCTION

MR. CHAIRMAN, GENTLEMEN, I APPRECIATE THE OPPORTUNITY TO ADDRESS YOUR COMMITTEE ON THE STATUS OF OUR SPECIAL OPERATIONS FORCES (SOF) AND THE PROGRESS THAT WE ARE MAKING IN REVITALIZING THESE CRITICAL NATIONAL DEFENSE ASSETS.

AS STATED IN THE SECRETARY OF DEFENSE'S FY 1988 ANNUAL REPORT TO CONGRESS, SOF PROVIDE THE UNITED STATES WITH A HIGHLY FLEXIBLE, SPECIALIZED CAPABILILTY TO PURSUE NATIONAL OBJECTIVES DURING PEACE OR WAR, EITHER INDEPENDENTLY OR IN CONJUNCTION WITH CONVENTIONAL FORCES.

IN PEACETIME, SOF, IN CONJUNCTION WITH OTHER MILITARY FORCES AND FEDERAL AGENCIES, PARTICIPATE IN SECURITY ASSISTANCE, CIVIC ACTION, AND HUMANITARIAN ASSISTANCE OPERATIONS. THEY ALSO SERVE AS PRIMARY FORCES IN COMBATTING TERRORISM.

FOR THE UNITED STATES TO HAVE A CREDIBLE SPECIAL OPERATIONS CAPABILITY THAT RUNS THE GAMUT FROM LOW-INTENSITY CONFLICT (LIC) AND PEACETIME OPERATIONS TO CONVENTIONAL AND NUCLEAR WAR, HIGHLY SKILLED AND DEDICATED PERSONNEL WITH VERY SPECIALIZED TRAINING AND EQUIPMENT ARE REQUIRED. THE REORGANIZATION EFFORTS UNDERWAY IN CREATING A NEW ASSISTANT SECRETARY OF DEFENSE AND NEW UNIFIED COMMAND WILL GO A LONG WAY TOWARD ACHIEVING THIS GOAL.

SOF REVITALIZATION

WHEN THE REAGAN ADMINISTRATION TOOK OFFICE IN 1981, THE TOTAL SOF BUDGET FOR ALL OUR SERVICES WAS $440 MILLION AND OUR SPECIAL OPERATIONS FORCES WERE IN A DEBILITATED STATE. AFTER

A DECADE OF NEGLECT, FORCE STRUCTURE HAD DWINDLED TO DANGEROUSLY LOW LEVELS, UNITS WERE UNDER-EQUIPPED AND ILL-PREPARED TO MEET THEIR COMMITMENTS, AND THE VITAL CONTRIBUTION THESE FORCES MAKE TO OUR NATIONAL SECURITY WAS POORLY UNDERSTOOD.

OUR GOAL WAS TO RESTORE A GLOBAL SOF CAPABILITY TO PERFORM BOTH THEIR PEACETIME MISSION OF DETERRING THE ESCALATION OF VIOLENCE BY COUNTERING AMBIGUOUS AGGRESSION, AND THEIR CONTINGENCY MISSION OF OPERATING IN CONJUNCTION WITH CONVENTIONAL FORCES IN THE EVENT OF CONVENTIONAL OR NUCLEAR WAR.

OUR SOF REVITALIZATION EFFORT WAS STRUCTURED TO AVOID SACRIFICING QUALITY FOR QUANTITY AND TO LAY A SOLID FOUNDATION FOR LONG-TERM FORCE SUSTAINMENT. THIS MEASURED APPROACH HAS RESULTED IN SUBSTANTIAL IMPROVEMENTS, BUT WE WILL FALL SHORT OF MEETING THE CINCs' SOF REQUIREMENTS WITHOUT CONTINUED CONGRESSIONAL SUPPORT AS WE COMPLETE THE EFFORT.

THE BUDGET REQUESTS CONTAINED IN THE FISCAL YEAR 1988 DEFENSE BUDGET PROVIDE US WITH AN OPPORTUNITY TO MEET AN OVERWHELMING MAJORITY OF THESE REQUIREMENTS WITHIN THE FY 1988 FIVE-YEAR DEFENSE PLAN (FYDP). THE FOLLOWING CHART ILLUSTRATES THE GROWTH THAT CAN BE ANTICIPATED IF FUNDING AT THE DEPARTMENT OF DEFENSE BUDGET LEVEL IS APPROVED.

THE INCREASE IN FORCE STRUCTURE IS READILY APPARENT AND, BY THE END OF FY 1991, WE WILL HAVE ELIMINATED MOST OF THE SHORTFALLS THAT FORCED US IN THE PAST TO ASSIGN MULTITHEATER TASKS TO OUR SOF UNITS. FURTHER EXPANSION, BASED ON NEW TECHNOLOGIES SUCH AS THOSE EMBODIED IN CV-22 TILT-ROTOR AIRCRAFT, WILL COMPLETE THE REVITALIZATION PROCESS IN THE EARLY-TO-MID 1990S.

ALSO APPARENT ARE INCREASES IN THE DEFENSE BUDGET REQUESTS FOR THESE FORCES. AS PREVIOUSLY MENTIONED, IN FY 1981 FUNDING FOR ALL OUR SOF PROGRAMS WAS $440 MILLION. IN FY 1986, THIS FIGURE WAS $1.2 BILLION AND IN FY 1988, THE REQUEST IS FOR $2.5 BILLION. SOF PROGRAMS IN THE FY 1988-92 FIVE-YEAR DEFENSE PLAN ACCOUNT FOR $10.5 BILLION.

SOF Force Structure Expansion

MAJOR SOF UNITS	FY 1981	FY 1987	FY 1992
Special Forces Groups[A]	7	8	9
Ranger Battalions	2	3	3
Psychological Operations Battalions	3	4	4
Civil Affairs Battalion	1	1	1
SEAL Teams	2	5[B]	6[B]
SEAL Delivery Vehicle (SDV) Teams	0	2[B]	2[B]
Special Operations Wings	1	1	3
Special Operations Aviation Battalions	1	2	3
Total	17	26	31
PRIMARY AIRCRAFT			
Air Force			
MC-130E/H Combat Talons	14	14	38
AC-130A/H/U Gunships[C]	20	20	22
MH-53H/J Pave Low Helicopters	9	19	41
CV-22 Ospreys[D]	0	0	6
EC-130E Volant Solos	4	4	4
HC-130 Tankers (SOF-dedicated)	0	8	31
C-141s Special Ops Low Level II (SOLL II)	0	0	13
C-130s SOLL II	0	0	11
Total	47	65	166
Army			
MH-60X Helicopters	0	0	23
MH-47E Helicopters (Pave Low equivalent)	0	0	17
MH-60 FLIR (SOF-dedicated) Helicopters	0	16	21
M/UH-60 (SOF-dedicated) Helicopters	0	29	17
CH-47D (SOF-dedicated)(10 with FLIR) Helos	0	16	0
UH-1 (SOF-dedicated) Helicopters	0	23	23
A/MH-6 (SOF-dedicated) Helicopters	29	54	29
Total	29	138	130
Navy			
HH-60H Helicopters	0	0	18
PRIMARY NAVAL EQUIPMENT			
Seafox (Special Warfare Craft, Light)	12	36	36
Sea Viking (Special Warfare Craft, Medium)	0	0	19
High Speed Boat	0	0	7
Dry Deck Shelters (DDS)	0	2	6
Submarines modified to accommodate DDS	0	5	7
SEAL Delivery Vehicles (SDVs)	18	19	19
Advanced SDVs	0	0	1
Total	30	62	95

[A] Includes four Reserve Component Groups.

[B] Includes two Underwater Demolition Teams redesignated in 1983.

[C] Includes ten AC-130A Air Force Reserve gunships in FYs 1981/87. FY 1992 number reflects decommissioning of AC-130As and addition of 12 AC-130U aircraft.

[D] Includes programmed procurement through FY 1992. Actual deliveries will not begin until FY 1994. Total to be procured for SOF will be 55.

Less apparent are enhancements in readiness. In particular, Army SOF units are now manned at high levels consistent with their

HEAVY PEACETIME UTILIZATION AND EARLY WARTIME DEPLOYMENT. THEIR EQUIPMENT IS BEING MODERNIZED, ESPECIALLY IN THE FIELD OF COMMUNICATIONS. SIMILARLY, AIR FORCE SOF UNITS HAVE BENEFITED FROM ENHANCED MAINTENANCE AS WELL AS SYSTEMS UPGRADES. NAVAL SPECIAL WARFARE UNITS HAVE RECEIVED EXCELLENT RESOURCE SUPPORT, AS ILLUSTRATED BY ACCELERATED DRY DECK SHELTER PROCUREMENT AND WEAPONS AND COMMUNICATIONS ACQUISITIONS.

SOF AIRLIFT

IN THE PAST YEAR, WE HAVE RESOLVED THE MOST CRUCIAL SOF ISSUE -- AIRLIFT SUPPORT -- AND ARE RESOLVING OUR ORGANIZATIONAL STRUCTURE. FOR SOME TIME, BOTH THE ADMINISTRATION AND THE CONGRESS HAVE RECOGNIZED THAT AIRLIFT CONSTITUTES OUR MOST SERIOUS SPECIAL OPERATIONS DEFICIENCY, AND OUR FY 1988-92 PROGRAM REQUESTS THE INCREASED FUNDING NEEDED TO BEGIN TO MEET THE REQUIREMENTS.

IN THE NEAR-TERM, WE ARE INCREASING THE READINESS OF THE FORCE, PROCURING ADDITIONAL FIXED- AND ROTARY-WING AIRCRAFT. FOR THE FIRST TIME, WE ARE ALSO INCORPORATING DEDICATED SOF TANKER SUPPORT THAT FORMERLY REQUIRED SPECIAL APPORTIONMENT AND ALLOCATION APPROVAL FROM MILITARY AIRLIFT COMMAND. ADDITIONALLY, A NEW FORCE STRUCTURE STRATEGY WAS DEVELOPED THAT UTILIZES A MIX OF SOF AND DUAL-HATTED CONVENTIONAL AIRLIFT AIRCRAFT. THIS WILL ENABLE US TO ACCELERATE THE MAJORITY OF OUR SOF AIRLIFT PROGRAMS AND PUT RUBBER-ON-THE-RAMP TWO YEARS AHEAD OF SCHEDULE (I.E, 1989 AND 1990 VICE 1991 AND 1992). FOR THE LONGER TERM, WE HAVE ALSO ACCELERATED PROCUREMENT OF THE CV-22, THE NEXT-GENERATION SOF AIRCRAFT, BY ONE YEAR, AGAIN WITH DEDICATED TANKER SUPPORT.

FOR THE FY 1988-92 PERIOD, WE HAVE PROGRAMMED A TOTAL OF $6.8 BILLION FOR SOF AIRLIFT ENHANCEMENTS, NEW AIRCRAFT, AND SYSTEMS UPGRADES. THIS IS A SUBSTANTIAL INCREASE IN PROGRAMMED FUNDING AND BUDGET PRIORITIES COMPARED TO ANY PAST PERIOD.

IN CLOSE COORDINATION WITH THE CINCS, WE HAVE SERIOUSLY REVIEWED AND REVISED THE OPERATIONAL INTEGRATION OF SOF AIRLIFT FORCES INTO THEATER WAR PLANS AND INCREASED EMPHASIS ON THE

OPERATIONS AND MAINTENANCE BUDGETS TO PROVIDE THE HIGH STATE OF READINESS REQUIRED TO RESPOND TO PEACETIME CONTINGENCIES.

IN WARTIME, SOF AIRLIFT WILL BE USED PRIMARILY AS INFILTRATION, EXFILTRATION, AND RESUPPLY PLATFORMS FOR ARMY SPECIAL FORCES AND NAVAL SPECIAL WARFARE UNITS. THEY MAY ALSO CONDUCT OTHER SOF-ORIENTED MISSIONS SUCH AS PSYCHOLOGICAL OPERATIONS AND CERTAIN COMBAT RESCUE MISSIONS.

IN PEACETIME, THESE AIRCRAFT COULD BE USED FOR HUMANITARIAN ASSISTANCE, CIVIC ACTION, PSYCHOLOGICAL OPERATIONS, FOREIGN INTERNAL DEFENSE, COUNTERTERRORISM, AND COMBATTING THREATS ENCOMPASSED UNDER THE RUBRIC OF LOW-INTENSITY CONFLICT.

SOF REORGANIZATION

WITH REGARD TO SOF ORGANIZATION, THE UNIQUE NATURE OF THESE FORCES IMPOSES UNUSUAL REQUIREMENTS FOR COMMAND AND CONTROL AND RESOURCE PROPONENCY. RECOGNIZING THE NEED FOR CHANGE AS PART OF OUR REVITALIZATION EFFORT, AND IN COMPLIANCE WITH THE SPECIAL OPERATIONS REORGANIZATION LEGISLATION, WE HAVE UNDERTAKEN, A MAJOR RESTRUCTURING OF OUR SOF ORGANIZATIONS.

FIRST, WE ARE ESTABLISHING THE U.S. SPECIAL OPERATIONS COMMAND (USSOC), A UNIFIED COMMAND THAT WILL ENHANCE SOF READINESS. THE CONDUCT OF SPECIAL OPERATIONS WILL REMAIN THE RESPONSIBILITY OF THE THEATER UNIFIED COMMANDS, BUT USSOC MAY ALSO CONDUCT SPECIAL OPERATIONS IF SO DIRECTED BY THE NATIONAL COMMAND AUTHORITIES (NCA).

WE ARE ALSO ESTABLISHING AN ASSISTANT SECRETARY OF DEFENSE FOR SPECIAL OPERATIONS AND LOW-INTENSITY CONFLICT. THIS ASSISTANT SECRETARY WILL BE RESPONSIBLE FOR BOTH POLICY AND RESOURCE OVERSIGHT; WILL SUPERVISE PREPARATION OF SOF PROGRAMS AND BUDGETS BASED ON REQUIREMENTS IDENTIFIED BY USSOC; AND WILL REPRESENT SOF INTERESTS WITHIN THE DECISION-MAKING COUNCILS OF THE DEPARTMENT OF DEFENSE.

WE BELIEVE THESE CHANGES WILL INSTITUTIONALIZE SOF AS A VITAL ELEMENT WITHIN OUR ARMED FORCES AND ASSIST US IN MEETING OUR REVITALIZATION GOALS. THEY WILL ALSO ENSURE THAT EFFECTIVE, JOINT SOF WILL BE AVAILABLE WHEN NEEDED TO ATTAIN NATIONAL SECURITY OBJECTIVES.

I WOULD LIKE TO OUTLINE THE PROGRESS MADE IN OUR SOF REORGANIZATION EFFORTS BY SPECIFIC AREA.

I. ASSISTANT SECRETARY OF DEFENSE FOR SPECIAL OPERATIONS AND LOW-INTENSITY CONFLICT--ASD(SO/LIC)

WE ARE ESTABLISHING THE ASD(SO/LIC), WHO WILL BE RESPONSIBLE FOR OVERALL SUPERVISION (INCLUDING OVERSIGHT OF POLICY AND RESOURCES) OF SPECIAL OPERATIONS (SO) AND LOW-INTENSITY CONFLICT (LIC) ACTIVITIES WITHIN THE DEPARTMENT OF DEFENSE. THE RECOMMENDATION FOR THE ASD(SO/LIC) WILL BE FORWARDED TO THE PRESIDENT BY MID-APRIL.

THERE WILL BE A PRINCIPAL DEPUTY ASSISTANT SECRETARY OF DEFENSE (SO/LIC) WHO WILL BE THE PRINCIPAL STAFF ASSISTANT TO THE ASD, WILL ACT FOR HIM IN HIS ABSENCE, AND WILL BE SPECIFICALLY RESPONSIBLE FOR OVERALL INTEGRATION OF THE ACTIVITIES OF THE SUBORDINATE COMPONENTS.

THE OFFICE OF THE ASD(SO/LIC) WILL BE ORGANIZED INTO THREE FUNCTIONAL ELEMENTS, EACH DIRECTED BY A DEPUTY ASSISTANT SECRETARY OF DEFENSE. THE INITIAL MANNING WILL BE 54 PERSONNEL AND MAY EXPAND AS NECESSARY TO PERFORM FUNCTIONAL MISSION RESPONSIBILITIES.

> THE DEPUTY ASSISTANT SECRETARY FOR SPECIAL OPERATIONS WILL BE RESPONSIBLE FOR THE DEVELOPMENT OF DOD POLICY ON SPECIAL OPERATIONS AND FOR OVERSEEING IMPLEMENTATION OF THAT POLICY.
>
> THE DEPUTY ASSISTANT SECRETARY FOR LOW-INTENSITY CONFLICT WILL BE RESPONSIBLE FOR DEVELOPMENT OF DOD POLICY ON LIC AND FOR OVERSEEING IMPLEMENTATION OF THAT POLICY.

The Deputy Assistant Secretary for Resources will be responsible for overall supervision of resources related to special operations and LIC. This will include overall supervision of the preparation and justification of program and budget proposals to be included in FYDP Program 11 for SOF and review of USSOC proposals for the development and acquisition of equipment, other material, supplies, and services peculiar to special operations. Oversight of RD&A activities will be accomplished within the newly developed structure and charter of the ASD(SO/LIC) and USCINCSOC.

II. FYDP Program 11

On 27 March 1987, the Deputy Secretary of Defense directed the implementation of Major Force Program 11 for Special Operations Forces within the Five-Year Defense Plan (FYDP Program 11). This program consolidates SOF unique funding currently displayed in FYDP Program 2 (General Purpose Forces) and other programs, and includes the USSOC budget as well as other SOF resources contributed by the Services and Defense Agencies. Service programs contained in the 17 December 1985 JSCP Annex E, such as all SOF aircraft, JSOC forces, and Naval Special Warfare Forces and their resources are included.

III. The Position of Assistant Secretary of Defense (SO/LIC)

Oversight of special operations and low-intensity conflict will be quite demanding, especially in the first years of the reorganization process. We have been proceeding very deliberately in reviewing the qualifications of a number of candidates for the position of ASD(SO/LIC). The interview process by the Secretary of Defense is complete and, as previously stated, a recommendation will be forwarded to the President by mid-April.

While this amendment specifies creation of the ASD(SO/LIC), TITLE 10 RESTRICTS DOD TO ELEVEN ASD POSITIONS, ALL OF WHICH ARE CURRENTLY ENCUMBERED OR DESIGNATED. THEREFORE, WE REQUEST THAT CONGRESS AMEND TITLE 10 TO AUTHORIZE A TOTAL OF TWELVE ASD POSITIONS. HOWEVER, WE ARE CONTINUING WITH THE ESTABLISHMENT OF THE ASD (SO/LIC) AND WILL COMPLY WITH THE PROVISIONS OF THE SOF REORGANIZATION LEGISLATION.

ONCE ESTABLISHED, THE ASD(SO/LIC) AND HIS PRINCIPAL DEPUTY WILL BE LOCATED ON THE E-RING OF THE PENTAGON WITH THE OTHER ASDs. ALL OTHER DASDs AND STAFFS WHOSE RESPONSIBILITIES INCLUDE TIME-SENSITIVE OPERATIONS AND WORK REQUIRING EXTENSIVE SERVICE, JCS, AND OSD COORDINATION (E.G., COUNTERTERRORISM AND SPECIAL OPERATIONS) WILL ALSO BE IN THE PENTAGON. THE REMAINDER OF THE ORGANIZATION WILL BE LOCATED IN ROSSLYN DUE TO SPACE LIMITATIONS WITHIN THE PENTAGON.

IV. ORGANIZATIONAL PROGRESS

WE ARE PROVIDING SUBSTANTIAL STAFF EXPANSION TO ENHANCE OUR MANAGEMENT CAPABILITY OF THESE IMPORTANT ACTIVITIES AND HAVE BEGUN THE PROCESS OF BRINGING NEW PERSONNEL ON BOARD. WE HAVE ALSO IDENTIFIED PHYSICAL FACILITIES TO ACCOMMODATE THE NEW ASSISTANT SECRETARY AND SUBORDINATE STAFF ELEMENTS.

V. UNIFIED COMBATANT COMMAND FOR SPECIAL OPERATIONS

THE REFERENCED LEGISLATION REQUIRES THAT THE PRESIDENT, THROUGH THE SECRETARY OF DEFENSE, WITH THE ADVICE AND ASSISTANCE OF THE CHAIRMAN OF THE JOINT CHIEFS OF STAFF, ESTABLISH A UNIFIED COMBATANT COMMAND FOR SPECIAL OPERATIONS FORCES. ON 18 MARCH 1987, THE JOINT CHIEFS OF STAFF RECOMMENDED THAT THE SECRETARY OF DEFENSE DISESTABLISH US READINESS COMMAND (USREDCOM) TO PROVIDE BILLETS AND FACILITIES FOR US SPECIAL OPERATIONS COMMAND (USSOC). USREDCOM MISSIONS WOULD BE TRANSFERRED TO OTHER COMMANDS. THE DEACTIVATION OF USREDCOM AND ACTIVATION OF USSOC WILL REQUIRE DETAILED IMPLEMENTATION PLANS. A PLAN TO INITIATE THE REQUIRED ACTIONS INCLUDES DATES FOR THE ACTIVATION OF USSOC NOT LATER THAN

16 April 1987. Changes to the Unified Command Plan (UCP) related to these actions will be forwarded to the President for approval.

Forming USSOC via this process achieves the earliest operational date for the USSOC. Utilization of the USREDCOM headquarters facilities at MacDill Air Force Base avoids an approximate two year delay and the expense of programming for and building a headquarters facility for the command. It should also be noted that MacDill Air Force Base has excellent airfield facilities and convenient access to most assigned forces. In fact, USCINCSOC would only be two hours flying time from the Washington area.

VI. Assignment of Forces

With the exception of the Naval Special Warfare Groups, all SOF stationed in the United States will be assigned to USSOC, including the Joint Special Operations Command (JSOC). Command and control of JSOC for contingency operations will be directed by the NCA. The component forces of USSOC will comprise Army Special Forces, Ranger, and Special Operations Aviation units in addition to the Special Warfare Center and School; Air Force C-130 Combat Talon, HH-53 Pave Low, AC-130 gunships, Combat Control, Special Operations School, and other related units; and the Naval Special Warfare Center. Naval Special Warfare Groups currently assigned to the US Atlantic Command and US Pacific Command will remain assigned to their respective CINCS. Reserve Component SOF, except those reserve units which mobilize to Naval Special Warfare Groups, will also be assigned to USSOC to enhance their preparation to support the regional unified commanders.

VII. Command Activity

The charter for USSOC will describe the USSOC mission, functions, and responsibilities. The principal function of USSOC will be to prepare Special Operations Forces to carry out assigned missions. USSOC responsibilities in support of that

PRINCIPAL FUNCTION WILL BE DETAILED IN THE CHARTER, INCLUDING: DEVELOPMENT OF SPECIAL OPERATIONS STRATEGY, DOCTRINE, AND TACTICS; SPECIAL OPERATIONS TRAINING; VALIDATING REQUIREMENTS AND ESTABLISHING PRIORITIES WITHIN THE PLANNING, PROGRAMMING, AND BUDGETING SYSTEM; FORMULATING AND SUBMITTING REQUIREMENTS FOR INTELLIGENCE SUPPORT; AND MONITORING PROMOTIONS, ASSIGNMENTS, RETENTION, TRAINING, AND PROFESSIONAL MILITARY EDUCATION OF SPECIAL OPERATIONS PERSONNEL. THE USSOC COMMANDER IS ALSO RESPONSIBLE FOR EXERCISING COMMAND OF A SELECTED SPECIAL OPERATIONS MISSION IF DIRECTED TO DO SO BY THE NATIONAL COMMAND AUTHORITY.

VIII. COMMANDER

THE PRESIDENT WILL FORWARD A NOMINATION FOR THE POSITION OF COMMANDER-IN-CHIEF OF THE U.S. SPECIAL OPERATIONS COMMAND (USCINCSOC) IN THE VERY NEAR FUTURE. THE USSOC HEADQUARTERS JOINT MANPOWER PROGRAM (JMP) IS BEING DEVELOPED AT AN INITIAL LEVEL OF 250 PERSONS, BUT HAS A PLANNED GROWTH TO 446 BY 1989 AND WILL FOLLOW A STANDARD JOINT HEADQUARTERS STRUCTURE. ANY FUTURE REQUIREMENTS FOR ADDITIONAL MANNING WOULD BE SUBMITTED, WITH JUSTIFICATION, BY USCINCSOC FOR REVIEW AND APPROVAL BY THE JOINT CHIEFS OF STAFF.

IX. GENERAL/FLAG OFFICER GRADE FOR THE COMMANDERS OF THE SPECIAL OPERATIONS COMMAND, EUROPE (SOCEUR) AND SPECIAL OPERATIONS COMMAND, PACIFIC (SOCPAC)

THE SPECIAL OPERATIONS LEGISLATION REQUIRES THAT THE COMMANDERS OF SOCEUR AND SOCPAC BE OF GENERAL OR FLAG OFFICER GRADE. THE JOINT STAFF HAS REQUESTED RECOMMENDATIONS FROM USCINCEUR AND USCINCPAC ON THE GRADE AND SERVICE OF THE COMMANDERS OF SOCEUR AND SOCPAC. IN MAKING THEIR DETERMINATION, USCINCEUR AND USCINCPAC ARE DEFINING THE RESPONSIBILITIES OF THEIR RESPECTIVE SOC COMMANDERS, COMMENSURATE WITH THE RECOMMENDED GRADE OF O-7 (I.E., BRIGADIER GENERAL OR REAR ADMIRAL/LOWER HALF). THE

JOINT CHIEFS OF STAFF WILL REVIEW, FOR APPROVAL, THE RECOMMENDATIONS FOR THE NEW GENERAL OFFICER COMMAND POSITIONS IN CONJUNCTION WITH THE GENERAL OFFICER REQUIREMENTS STUDY FOR USSOC.

THE DEPARTMENT OF DEFENSE HAS EXPENDED A GREAT DEAL OF TIME, EFFORT, AND FUNDING TO REVITALIZE AND REORGANIZE OUR SPECIAL OPERATIONS FORCES. WITH YOUR CONTINUED SUPPORT, THESE FORCES WILL BE READY AND ABLE TO MEET THE INSIDIOUS AND BLATANT CHALLENGES TO OUR NATIONAL SECURITY -- BOTH NOW AND IN THE FUTURE.

THANK YOU.

Senator KENNEDY. We would first hear from General Kelly.

STATEMENT OF MAJ. GEN. THOMAS W. KELLY, DIRECTOR, JOINT SPECIAL OPERATIONS AGENCY, ORGANIZATION OF THE JOINT CHIEFS OF STAFF

General KELLY. Yes sir, I too have a statement, which is brief, which I will not read with your permission. I would like to jump into some comments.

I am relatively new to this job, having come to it last summer, and relatively new to Special Operations, having come to it last summer. But I have worked for Admiral Crowe before and I can assure you that he is deeply interested in forming a viable, vibrant, effective Special Operations Command.

We have discussed it a number of times, and I think there are some indicators we are taking some criticism because we appear to be moving slowly in forming this command. But there are some indicators on the other side of the coin.

The Secretary has already mentioned the resources that are being plowed into Special Operations, $10.5 billion dollars in the fiscal years 1988–92 Five-Year Defense Program. The forces assigned to the command I think are very indicative of the fact that the service Chiefs want to make this a good command.

We have the entire Army Special Operations Command to include the Special Forces Groups, the Rangers, and Aviation.

We have all of the 23d Air Force, which is allocated toward special operations.

We have the Joint Special Operations Command in that command, and very significantly, each service has a school that deals with doctrine, training and organization for Special Operations. All of those schools are in this command.

Senator Cohen, earlier you mentioned we need doctrine, training, organization and materiel. It seems to me, sir, the first thing we need is an integrated doctrine for Special Operations before we can derive organizations, training and materiel effectively.

Having those schools and having an integrating center, which we intend to have, is going to give us the capability to do that, and I think that may be one of the biggest steps forward that we will be able to take in this entire area.

I think because we selected MacDill, the command will be able to hit the ground running. If we had put them in trailers at Belvoir, it is my honest belief that the command would have spent a couple of years concerned with base development, concerned with getting a headquarters, concerned with telephones, concerned with bi-level communications capabilities, all of which exist at MacDill Air Force Base.

I was down there a couple of weeks ago and, sir, I flew from MacDill back to Andrews in less than 2 hours. Everything exists at MacDill for that command to hit the ground running and to function: security, communications, an airfield, and many, many other things. And so, I think that really was the right thing to do. Although I know there are people who disagree with me. There will be a Washington office to take care of the liaison that has to occur between this area and that.

It seems to me that the commander's focus should be on his troops and on getting them trained and on developing doctrine. I think he will be better able to do that down there. The components of the command are already in place. We have already begun some actions.

As a matter of fact, in early March we designated, we being the JCS, USREDCOM as executive agent to begin to plan for the implementation of the command. They have been quite busy since then. General Lindsay, the commander of USREDCOM is the executive agent for doing that. He has been doing quite a lot of work.

So I think we are going to surprise you. I think we are going to have a viable and vital command. I think it's going to do a very good job, and I think in the final analysis you will agree that putting it down at MacDill was not all that bad an idea.

[The prepared statement of Maj. Gen. Thomas Kelly follows:]

PREPARED STATEMENT BY MAJ. GEN. THOMAS W. KELLY, DIRECTOR, JOINT SPECIAL OPERATIONS AGENCY, ORGANIZATION OF THE JOINT CHIEFS OF STAFF

Mr. Chairman, gentlemen, I welcome the opportunity to speak to your committee on the status of our Nation's special operations forces, on the establishment of the U.S. Special Operations Command, or USSOC, and on some of our deliberations in the development of the command.

Since Admiral Crowe spoke to you in August, the services and the joint staff have continued to build a special operations structure which will command our special operations forces and prepare them for employment by the regional commanders. We feel we have taken the bold new approach Admiral Crowe promised in August, and we are working hard to fulfill the spirit and intent of the revitalization efforts begun several years ago.

I fully agree with Mr. Armitage that we have made tremendous progress in resolving the SOF airlift support issue. On 31 October 86, the Deputy Secretary of Defense approved a program developed by a working group formed by the Chairman of the Joint Chiefs of Staff and the Assistant Secretary of Defense for International Security Affairs. This program is included in the fiscal year 1988-92 5 year defense program (FYDP) and has been coordinated with the CINC's, services, OJCS, and OSD.

The program supports a responsible force structure to meet our global SOF airlift requirements. It provides us the capability to meet the CINC's SOF airlift requirements in either a global war, or a worst case regional war in any theater plus a worst case counterterrorism scenario simultaneously.

The program takes advantage of a full range of capabilities in a mix of aircraft already in the inventory, using less expensive modifications to aircraft vice procuring new ones. Additionally, this strategy permits us to complete all but the CV-22 portion of the SOF airlift revitalization effort 2 years ahead of our former procurement-oriented strategy. And as Mr. Armitage mentioned, the CV-22 procurement has been accelerated as well.

I urge your support for the supplemental request from the Air Force and the request for reprogramming authority by the Army. These are required to maintain balanced programs for their aircraft in the FYDP.

As Mr. Armitage discussed, we plan to establish USSOC at MacDill Air Force Base in Tampa, FL, by April 16, 1987. When we began developing this new command, we also looked for the best way to provide the command with the resources and facilities it needed to perform its mission, while at the same time keeping down both personnel and monetary costs.

Disestablishing USREDCOM was a logical solution for several reasons. First, the proposed transfer of the joint deployment agency and its related functions to the recommended new unified transportation command will change USREDCOM's role within the unified command structure. By reassigning the remaining USREDCOM missions and functions to other commands and agencies, a net manpower savings could be realized.

Then, disestablishing USREDCOM would free, for USSOC, the substantial USREDCOM facilities at MacDill Air Force Base in Tampa, FL. These facilities include all the requirements of the new command headquarters, such as a facility for sensitive compartmented information and a full suite of both open and secure communications. And the $60 million facilities would be immediately available, avoiding the several year delay and significant cost of building suitable facilities somewhere else, including the Washington, DC area. Another advantage is the operational security provided by a large military airfield outside the more intense hostile intelligence collection area of Washington. The disestablishment of USREDCOM will also provide the manpower spaces for the initial manning of the command. We plan to have all USREDCOM missions transferred to other commands and have USSOC assume all its special operations functions by 30 September 1987.

The unified and specified commanders were consulted and they concurred in the concept of using USREDCOM resources to build USSOC. Then, to develop a specific, detailed implementation plan, the Joint Chiefs of Staff appointed USCINCRED, General Lindsay, as executive agent for the planning of USSOC establishment. General Lindsay is developing his proposed command charter, manpower requirements and implementation.

Another issue which we have studied very carefully is the assignment of forces. The United States based Army and Air Force special operations forces will be assigned to the command, including eight active and reserve component special forces groups, the Ranger regiment, and the special operations forces presently assigned to 23rd Air Force. We have recommended to the Secretary of Defense that the naval special warfare groups on the east and west coasts not be assigned. This is in view of their special relationship with the unified commands, USLANTCOM and USPACOM, to which they are currently assigned. We have recommended they remain assigned to those unified commands.

Additionally, the Joint Chiefs of Staff recommended that the services' special operations schools be included in the command, to give USCINCSOC the tools to develop special operations strategy, doctrine and tactics. These schools are unique to USCINCSOC and they will assist him in meeting the special operations revitalization goals. By integrating special operations doctrine into the total force strategy, special operations will be better equipped to fill their roles as a force multiplier and as an economy of force measure for the fighting CINCS.

With those comments on our development of the new command, do you have any questions?

Senator **Kennedy**. Thank you very much. Mr. Armitage, I think it is regrettable that we have to announce a hearing in order to get some action by the Defense Department in conforming with the legislation. I think some of the announcements you make obviously bring into conformity the Defense Department. It is regrettable that we hear now that the Assistant Secretary is expected to be announced in the next 2 or 3 days.

There is a very clear sense, I think, that the kind of lethargy and resistance that was so much a part of the Defense Department a year or so again when Senator Nunn and Senator Cohen worked out these organizationals still is in existence. And that it is not getting the high level consideration and management support that it deserves.

The fact of the matter is that the ASD for the Special Operations has not yet been named.

Now do I understand that they are going to be named in the next couple days?

Mr. ARMITAGE. Well that will be up to the President. The Secretary told me this morning he would forward the name. He completed his last interview this morning and he will forward the name to the President in the next 2 or 3 days, Senator Kennedy.

Senator KENNEDY. When did you say that we would get some decision about the CINC for the new Special Operations Forces?

Mr. ARMITAGE. Mr. Chairman, our recommendation, that is the Secretary's, rests in the White House now. We are hanging fire waiting for it to be released and I cannot confidently say when they are going to let it go.

Senator KENNEDY. So you are not able to tell us when we are going to get a final sign off on that?

Mr. ARMITAGE. Well, we are planning to be able to have the command inaugurated, if you will, on April 14, 15, or 16. So we are hopeful that we are going to have this nomination out and hopefully we can prevail upon you to give us a hearing.

On the question of the ASD, I don't so much dispute what you say about it being regrettable to have to hold a hearing. The witnesses up here certainly agree with that statement. But I would say that we have had a bit more consultation with staff about some of these matters than I think it is generally recognized.

I think, perhaps what caused us the problem was what I mentioned in my opening statement, that is I wish I could help redraft that letter we sent over as an interim response to you. I think that had it been a little more carefully drafted it would have been received a lot better up here.

MAC DILL AIR FORCE BASE

Senator KENNEDY. Let me just ask you or the General about MacDill Air Force Base.

We are going to be spending I guess close to $10.5 billion on Special Operations over the next 5 years. You have the Special Operations Advisory Group that said that had we been consulted we would have recommended against the placement of your Special Operations command at MacDill.

It is our view that given the sensitivity, political and military character and importance of the challenge to which U.S. Special Operations will have to respond, the command should be located in Washington, D.C., Fort Belvoir and/or Andrews Air Force Base. Now given their recommendation or given the fact that you are going to be expending a very sizable amount of money in any event, I would not want to see $60 million wasted. But does it not make more sense to do it right and set this whole operation up right and have it done correctly the first time, rather than to follow the course which you have commented on?

Mr. **Armitage**. Well, yes Mr. Chairman, I certainly agree it is better to set it up right. We believe in the axiom that if you want it bad, you get it bad, and we want to make sure we get it right. We think we are doing right for the many reasons General Kelly and I have already enumerated.

But there is one other item. Much of the conversation concerning the desirability of having the command in the Washington area, I think, came out of Admiral Crowe's and my own testimony last year when we talked about this concept in relation to what we saw as a Special Operations Force command headed by a three-star, with no ASD, and the Chairman of the Joint Chiefs of Staff as the principal for SOF.

The difference in the legislation which was proposed by the Senate, and which the House receded to, means that we have a full time, four-star general/flag officer in charge of the command and an ASD who sits full time on oversight of all the matters regarding SOF from budget to policy. So we feel that we have taken into consideration the concerns expressed very forthrightly by the SOPAG. And that, combined with the Washington Liaison Office, which is something that they also indicated in their letter would be acceptable, though not optimum, has taken care of that problem.

Senator **Kennedy**. The advisory group did not share that particular viewpoint.

Mr. **Armitage**. No. And I am sure they can testify to that. They are here today and they will give you their points of view.

Senator **Kennedy**. Senator Cohen.

LOCATION OF STAFF

Senator **Cohen**. How many of the staff will be located outside the Pentagon temporarily?

Mr. **Armitage**. In the initial cut of 54 I would say that approximataly 29 to 30 would be outside the Pentagon initially.

The largest element in my view, would have to be the DASD for Resources. I think this will probably be the largest component located outside the Pentagon in Rosslyn.

Senator **Cohen**. Any other office within the Pentagon that has that kind of a split?

Mr. **Armitage**. Yes, several in Policy. Some of DSAA is outside, some of Technology Transfer, in fact all of it except the head office is outside.

Senator **Cohen**. But the Assistant Secretary of Defense has half his staff outside the Pentagon?

Mr. **Armitage**. No, the Assistant Secretary has well over half his staff outside the Pentagon in the Technology Transfer area, sir.

Senator **Cohen**. Would you rate that the equivalent of what the importance of this mission is going to be?

Mr. **Armitage**. No, for two reasons. One, it is not mine, and two, I believe that this is much more important. I think we have taken that into consideration, and we are locating the time sensitive elements in the Pentagon.

Senator **Cohen**. How did you arrive at the number 54?

Mr. **Armitage**. We took a look at the set up which has, as I indicated a Principal Deputy, and three Deputy Assistant Secretaries (one for Low-Intensity Conflict, one for Special Operations and one for Resources). We examined other organizations as to what would be necessary as an initial staffing and that is it. That is why I underline in my prepared questions the word initial. Because this is an initial cut.

I might add, Senator Cohen that this does not compare all that unfavorably with other ASDs. This is the most carefully guarded secret in the Pentagon, one that I haven't totally broken the code on. But the ASD staffing runs the gamut from a low of 44 to, I'm told, a high of 200. I myself would like to find out who's got 200.

Senator **Cohen**. What did SOPAG recommend in terms of staff?

Mr. **Armitage**. They did not recommend in terms of staff size.

Senator **Cohen**. Was there an informal recommendation of 1981?

Mr. **Armitage**. No, that was our own internal number. This is what we see, but I have an initial okay for 54.

Senator **Cohen**. Does it make more sense to you to have the Assistant Secretary for Defense for Low Intensity set up his own operation, rather than having it in place before he arrives?

Mr. **Armitage**. Yes, and I think that is what we are doing. We estimate we would have about 22 or 23 on board before the Assistant Secretary arrives. These are people who are already in my shop who I am going to move over, and people from JSOA, as JSOA draws down from 50 odd to 22 or so. Some of those JSOA people that have been most heavily involved in the drawing up of the charter, and all of the leg work on the USSOC and the ASD will naturally come under the new organization.

Senator **Cohen**. What I am asking you is would it not make more sense to have the Assistant Secretary for the Low-Intensity Conflict set up his own staff, rather than have the staff in place before he arrives?

Mr. **Armitage**. I am sorry, I will try to answer better.

All the Deputy Assistant Secretaries will be chosen by the ASD. The majority of the 54 will be chosen by the ASD. The others are people who have been working already in Special Operations associated duties in my office and in JSOA. We feel that they would come under this Assistant Secretary very naturally.

Senator **Cohen**. Did your office contact General Tixier?

Mr. **Armitage**. Yes indeed.

Senator **Cohen**. To determine whether he would become available or might become available to be the new Assistant Secretary of Defense?

Mr. **Armitage**. He was called among others to see if he would consider it. He would have to retire if he did take it.

Senator **Cohen**. Precisely my question. Why would you want to contact a general who is in the service now to ask him to take a position when you have an adequate number of people who you could have called upon?

Mr. **Armitage**. I think it gets back to the Secretary of Defense's own view on the type people he wants to interview and I believe did interview. That is, people who have stature in SOF. People who have an ability to work with the Hill, which is necessary, people who have interagency ability, which is going to be key, and finally people who have some international experience. General Tixier has all of these qualifications, among others.

Senator **Cohen**. How about General Wilson, was he ever contacted?

Mr. **Armitage**. No, he was not.

Senator **Cohen**. General Meyer.

Mr. **Armitage**. He was not.

Senator **Cohen**. General Kingston.

Mr. **Armitage**. General Kingston was not.

Senator **Cohen**. Would you say that these people had prior Hill experience, prior experience in dealing with the field, a wide variety of international experience?

Mr. **Armitage**. Sure, absolutely.

Senator **Cohen**. No consideration given to their qualifications in this field?

Mr. **Armitage**. I think great consideration was given, as a matter of fact particularly on the subject of General Kingston. As General Kingston can tell you better than anyone else, the Secretary of Defense has enormous affection for him and indeed I would say was responsible over the objections of many of the Chiefs for forming CENTCOM and getting General Kingston his fourth star.

Senator **Cohen**. What are General Tixier's qualification and background in Special Operations?

Mr. **Armitage**. I will provide that in a classified hearing Senator.

Senator **Cohen**. Does he work in your office?

Mr. **Armitage**. No, he does not. He is commander of U.S. forces, Japan.

Senator **Cohen**. Did he work under your office?

Mr. **Armitage**. He did, 2 years ago, 2½ years ago as Deputy Assistant Secretary for Near East South Asia.

Senator **Cohen**. General Kelly, how long after it became operational did the Rapid Deployment Joint Task Force, which is CENTCOM have to wait until moving to permanent headquarters?

General **Kelly**. I will have to furnish that sir, I do not know.

[The information follows:]

The RDJTF was activated as a task force subordinate to USREDCOM on March 1, 1980. For three weeks it shared facilities in USREDCOM headquarters. On March 24, 1980, the RDJTF moved into temporary facilities in a converted alert facility. On August 15, 1980, the RDJTF staff expanded into six rented trailers. In October 1982, the first phase of construction of the permanent headquarters was completed and a portion of the RDJTF headquarters moved into the building. On January 1, 1983, the RDJTF was deactivated and USCENTCOM was formed. In September 1983, the second phase of the headquarters construction was completed and all of the USCENTCOM headquarters offices were consolidated in the permanent facility. Thus, the complete process, from activation through occupancy of the permanent headquarters building, spanned three and one half years. Some of the CENTCOM headquarters elements are still located in trailers or other buildings.

Senator **Cohen**. Ninety days. Here we are 5 months later, and we are still looking at moving them in.

General **Kelly**. Part of CENTCOM is still in trailers.

Senator **Cohen**. It moved into its headquarters within 90 days in any event.

Also my understanding is that U.S. Army officer engineer basic and advance courses are going to be relocated at Fort Leonard Wood, Missouri and that is going to have a closure date of June 1989.

General **Kelly**. They are going to move at some point. I believe there are already plans to backfill that. We checked Belvoir and found the facilities, adequate facilities, were not available there, sir.

Senator **Kennedy**. We will use the early bird rule. Senator Shelby.

Senator **Shelby**. I would defer to the President pro tempore at any time. Thank you.

RESERVE COMPONENT

I would like to get into the Reserve aspects, the Reserve component of the Special Operations Forces, since I have been told they constitute such a force, and would ask you to comment on that.

What is the state of readiness of the Reserves? What do you need most?

Mr. **Armitage**. Perhaps if I may ask General Kelly to comment, I would only make the statement that we do anticipate, that all the Reserve forces associated with Special Operations will be under this new command.

Senator **Shelby**. General Kelly, could you share that information with us to their quality, the state that they are in now as far as readiness?

General **Kelly**. The exact readiness status of our Special Operations Forces of course is classified sir. So I cannot go into it.

I can tell you that the Reserve component forces have good news and bad news.

The best news they have is that the folks who are in that business are exceptionally good. They have some equipment shortfalls. They have some skill shortfalls. They have some personnel shortfalls, and probably most of all, they have integrated training shortfalls at the higher levels.

Senator **Shelby**. How will the helicopter cut back in the Army effect the program?

General **Kelly**. I don't think it will affect it very much at all, because I don't think those cutbacks are going to come out in Special Operations.

Senator **Shelby**. Not out of that?

General **Kelly**. I don't believe so. And incidentally, I might add that once Program 11 is established by the dictate of the law, what is there can only be changed by the Secretary of Defense. What is in there?

Mr. **Armitage**. The significance being the services can't play with the money Senator. They can't reprogram just willy nilly.

Senator **Shelby**. Has the plan for the Special Operations Forces Airlift changed in the past year?

Mr. **Armitage**. Yes, it has.

Senator **Shelby**. Drastically?

Mr. **Armitage**. Yes indeed it has.

Senator **Shelby**. Go ahead.

Mr. **Armitage**. Well it has changed in that on April 1, 1986 we submitted, as we were required, to Congress something called an airlift report, at which time we had tabulated all of the requirements of all of the CINCs and JSOC, and submitted all of these to the Congress.

It became readily apparent during our Defense Resources Board hearings this summer, as Admiral Crowe and I were making presentations to the board on the need for increased funding and reprogramming for Special Operations Airlift, that the bill on that was about $5.3 billion. So we went back to the drawing board and put together, in Admiral Crowe's shop and my own with outside expertise what we call the blue ribbon panel on the airlift issue and rescrubbed all the numbers.

We came up with a new report which has been submitted in brief, certainly to staff, where we feel we can get approximately 97 percent of the capability for about $1.6 billion above those programs already budgeted rather than $5.3 billion. We think this is good staff work. I think, in general, the staff agrees with us, but there may be some hiccups out there somewhere.

Senator SHELBY. Mr. Chairman, that is all I have.

Senator KENNEDY. Senator McCain.

Senator McCAIN. Thank you Mr. Chairman, Mr. Secretary I must say I express some amusement about the headquarters location. The fact that it is outside of the Beltway may cause great consternation to some, but from my experience, occasionally we have found more efficiency outside of Washington, D.C. In fact there are many who avoid service in the Pentagon. Perhaps we have too many people in one place there.

Senator COHEN. Is the Senator suggesting that is why he left the Pentagon to run for the Senate? [Laughter.]

Senator McCAIN. I do believe that a case can be made that with the facilities that are there in Tampa it might provide with the kinds of communications and facilities which would put, which otherwise would put a strain on already scarce Milcon resources. Is that accurate?

Mr. ARMITAGE. Well I thank you very much. I would say it is extraodinarily accurate.

Senator McCAIN. And perhaps some of the Senate staffers who will continue to micro-manage down to who you are interviewing might enjoy a trip to Tampa and visit those facilities there. The weather is good there most of the time. I would commend a visit to them.

I am concerned, seriously Mr. Secretary, about the relationship between the SOF and the CINCs. It is still not clear to me, and perhaps General Kelly can elaborate on this, how the training is going to be conducted. People who are under the commands of the CINCs, how the doctrine is going to be formulated in coordination with the CINCs, the reorganization bill, which we passed. This bill which the Senate and the Congress of the United States passed, places enormous budgetary pressures on the process, and yet, it is not clear to me how this thing will really work. That is really, I think, a matter of serious concern and I would appreciate either you or General Kelly discussing that.

General KELLY. That is a very tough question, and that is the nub of the issue I think we face. I think that the commander-in-chief, whoever he may be, has three things that he needs to do when he takes command of this organization and begins to integrate it. And he has to integrate it vertically and horizontally.

He has to integrate it within SOF because we have the Army, the Navy and the Air Force with their own organizations that are not necessarily thinking the same way.

He has to integrate that into the combat organization. The first thing I think you have to do is to begin to tear down the double brick wall that exists between SOF and the rest of the U.S. military.

The reason I say the double brick wall is because I think they have both built it. And when he gets that down he has to get Special Operations recognized as an element of combat power, and then he has to get that combat power integrated into the rest of the U.S. military.

So that in my view, the most important thing that first commander will be doing will be selling SOF to his contemporaries and his colleagues, the other CINCs, and that probably is the reason that it makes most sense that the commander be a four-star officer, and the head of a unified command.

He has got to be a diplomat and a salesman, and I think that he can do that job much better at MacDill Air Force Base than he could in Washington where there would be many other demands on his time.

That is a tough question. That is the biggest problem he has. He has to begin to develop joint organization, joint doctrine. And incidentally, organization and doctrine too because the forces will be assigned to that command not attached to it as they are with many other CINCs. He is a unique individual in the annals of the U.S. military in my view.

Mr. Armitage. If I may, Senator, just add that as big a challenge as that will be, I would submit that there will even be a bigger challenge in the ability of this CINC to go out and to be able to explain competently and capably along with the Assistant Secretary for SO/LIC what SOF can do for the regional commanders, regional CINCs in terms of low-intensity conflict.

The enormous range of tools that will be available to the regional CINC to contain these LIC events will, I think, be one of the greatest challenges as well as everything General Kelly just mentioned.

Senator McCain. Well, I would suggest that you keep this committee and the Congress apprised of the progress there because I think it is an enormously difficult challenge. If we are going to make this work rather than just having an additional command structure, there has got to be not only organizational changes, but attitudinal changes as well.

Somewhat related to that, I noticed that in your statement of page 11, Mr. Secretary, that you mentioned that the Naval Special Warfare groups and also I understand the Marine Corps groups will not be assigned to JSOC, and yet all the other units will be. Is that true? And perhaps you can tell us why.

Mr. Armitage. Not to JSOC but to USSOC, the United States Special Ops Command. We had considered putting the Naval Special Warfare groups under the CINC, and looking carefully at the legislation and particularly the conferees explanatory notes concerning the legislation, we noted that all Special Operations Forces would be listed under the USSOC, except those so designated by the Secretary of Defense.

Further, the explanatory language went on to say that naval special warfare forces, assigned to LANTCOM and PACOM should remain under their respective regional CINCs.

We took advantage of this and left them with PACOM and with LANTCOM, and they will for those regional CINCs continue their day to day service for the fleet, which they rendered for so long.

However, I want to emphasize that all of the funding questions associated with SEAL Teams or Naval Special Warfare groups will be illuminated in Program 11 as well as the school, the BUD school, and all the associated schools or the Naval Special Warfare programs will be under Program 11.

General KELLY. If I could add to that.

The Marines do not have any special operational forces. They have Marine amphibious forces, special operations capable, which are their normal Marine amphibious units at sea and they have the capability. So they will not be in that command.

There is a difference with the SEALS however, with regard to Naval Special Warfare groups one and two on the West and East coast respectively. Heretofore, they were assigned to the fleet commanders. They are now assigned to the Commander-in-Chief. Each of the CINCs has a Special Operations Command, so that in the future those SEALS will be integrated into the Special Operations capability of that theater commander. This wasn't necessarily true in the past. So there is a little nuance there that is a difference.

Senator MCCAIN. Would you prefer to see, General from your perspective those Naval Special Warfare groups included in USSOC?

General KELLY. Sir, I honestly think you can work both sides of that street.

On the one hand, the Navy says we also have ships that are stationed on the east and west coasts, but are part of the fleets. The SEALS are in the same category because they work with the fleets. I can understand that.

Others say well, all Special Operations ought to be in the command because the Joint Chiefs have elected to do it this way and I sure support them.

Senator MCCAIN. Thank you Mr. Chairman.

Senator COHEN. Mr. Chairman, if I could follow up on one point raised by the Senator from Arizona.

If I could point out it was not the Senate staff who raised the issue of the location of the Special Operations Command down at MacDill, it was the SOPAG that raised the issue. That would be General Wilson, Yarborough, Blackburn, Meyer and Stilwell and others. It was not the Senate staff. I know that the Senator from Arizona has worked very closely with the Senate Armed Services Committee staff over the years, and holds them in the highest regard. They did not raise the issue of location.

Second, I would point out——

Senator MCCAIN. What about who was interviewed and who was not interviewed?

Senator COHEN. Well in terms of where the location would be, that was raised by former Generals who have some experience in the field. So it was not a Senate staff question.

Second, I think you touched upon the real issue, and that is one of attitude. The location becomes more significant when you find there has been a reluctant or resistant attitude within the Pentagon to the establishment of the command itself, and that by locating it elsewhere it tends to diminish its significance and its role. That is one of the reasons why we have been concerned about its location.

Senator MCCAIN. If I might respond, that is entirely a matter of opinion. Some people think that the opposite case could be made. By being farther away and having some independence and not having to trot over here all the time and be involved in the Pentagon bureaucracy, perhaps they could do a better job.

There is also that school of thought as well and one that I think makes a very compelling case.

I also think that it is a bit ludicrous when the Secretary of Defense cannot interview who he wants to for a job. The nominee comes over for the advise and consent of the Senate. I think to criticize even the interviewing process to me smacks of micro-management. I think that opinion would be shared by others.

Senator COHEN. I do not think it smacks of micro-management. It is a question as to whether it is being loaded up. That is what I am trying to find out.

Senator KENNEDY. Senator Stennis, do you have any questions?

Senator STENNIS. Thank you Mr. Chairman, I will pass.

Senator KENNEDY. Senator Nunn.

Chairman NUNN. Just a couple of questions Mr. Chairman.

Mr. Armitage, I understand, forgetting who the interviewees are, but just the question of what kind of individual you would have for Assistant Secretary of Defense for Special Operations, the question is one of civilian control that I would like to pose.

Have you all thought about that, and if so, what are your views of it?

Mr. ARMITAGE. If the question is are we in favor of civilian control, absolutely.

If the question is should an Assistant Secretary of Defense be one who has served in the armed forces, we happen to feel, in general, yes.

I think the question in this particular case comes down to, depending on who is chosen, what is a significant amount of time to wash off the military, if you will. I think any man who has made a military career or a career of 20 or 30 years in the service can be a civilian for x number of years and not wash it off.

But if that is the kind of question behind the question on civilian control, that is certainly something that we are in favor of.

Chairman NUNN. Well, have you interviewed any that are not immediately retired military?

Mr. ARMITAGE. Yes we have, sir. We have interviewed those who were wounded, for instance, in Vietnam in Special Operations billets. We have interviewed some of those recommended from here. We have interviewed others who have served for 2, 3, or 4 years in SOF billets in one place or another recommended by the House.

We have interviewed people who have been, as I say, walk ins, or rather thrown ins from the Presidential personnel section, people who have a SOF background.

We have also interviewed one active duty military officer.

Chairman NUNN. General Kelly, do you have any thoughts on whether the Assistant Secretary of Defense ought to be someone who has either been retired quite a while or someone who is not certainly just coming out of the military, or whether you have a contrary view.

General KELLY. Sir, I have two thoughts.

No. 1, it is beyond my pay grade, and No. 2, I do not want the job. [Laughter.]

If you are asking for my opinion——

Chairman NUNN. I just want your opinion, that is right.

General KELLY. I would think that the Secretary of Defense is fully competent to make that decision. I think that when a soldier or sailor, marine or airman takes off his uniform, he ought to have all the rights of being a citizen like other Americans do.

Chairman NUNN. Thank you Mr. Chairman.

Senator KENNEDY. Thank you very much. Senator Cohen.

Senator COHEN. As I recall, when Admiral Crowe was thinking about having a three star head up this command he also recommended that all Special Forces be included under the new command. My understanding is that the SEALS have been exempted and taken out.

Mr. ARMITAGE. That is right.

Senator COHEN. Is that consistent with Admiral Crowe's recommendation?

Mr. ARMITAGE. Yes sir. I spoke to him about it yesterday sir.

Senator COHEN. What did he mean last year when he talked about having all Special Forces included?

Mr. ARMITAGE. Well, I think he meant just what he said. We certainly looked at the situation in that way.

I stated that for two reasons.

One, the conferees explanatory language explicitly put LANTCOM and PACOM over the SEAL teams or the Naval Special Warfare groups.

Two, the fact that the SEALS had always serviced the fleet. We felt that by removing them from the fleet commands under the regional CINCs that this was sufficient, and in line with the spirit of the law. Furthermore, having identified all the funding issues associated with the SEALS we believe we were within the letter and the spirit of the law.

Senator COHEN. Thank you.

Senator KENNEDY. Thank you very much. We will allow any of the members who want to submit some questions to be submitted to you for your answers.

Senator KENNDY. We will ask the second panel, Mr. Noel Koch, who is the former Principal Deputy Assistant Secretary of Defense for International Security Affairs, General Edward Meyer, former Chief of Staff of the Army, Lieutenant General Samuel Wilson, former Director of the Defense Intelligence Agency, and former Deputy Assistant to the Secretary of Defense for Special Operations.

We will proceed.

It is also relevant to mention that both General Wilson and General Meyer are members of the advisory group on Special Operations.

We will start with Mr. Koch.

STATEMENT OF NOEL KOCH, FORMER PRINCIPAL DEPUTY ASSISTANT SECRETARY OF DEFENSE FOR INTERNATIONAL SECURITY AFFAIRS

Mr. Koch. Mr. Chairman, Senator Kennedy, thank you very much for the privilege of appearing before the committee this afternoon to discuss the restoration of our Special Operations Forces.

I am joined by a former colonel from our Special Operations Forces, Colonel DeProspero, who will help me with some training aids here when we get to the point that this becomes useful to do.

I have not submitted a prepared text. I will be happy to submit my notes and other material for the record according to your wishes.

With your permission I will address the implementation of Special Operations Forces reorganization legislation first, and then the current program proposals for SOF airlift if there is time left in the end. If not, then subsequently in the question and answer period.

In view of the limited time that we have, let me sacrifice diplomacy to directness and say that the Department of Defense has done everything possible to circumvent the will of the Congress as represented in this legislation and to subvert the legislation itself.

The latter point is of special concern for the following reason: the existence of a legislative mandate may lead some to the complacent view that no matter what the present leadership of the Pentagon may do to oppose Special Operations Forces, there is a law. It definitively concludes the matters.

But as former Secretary of Defense Donald Rumsfeld was quoted as pointing out this morning, the hardest thing to accomplish in Washington is to get a subject off the agenda. Nobody ever accepts an adverse decision. The decision is never final; they just keep coming back.

We may fairly conclude that those who fought against this legislation will have seen its passage as an adverse decision.

The implementation phase is all important. If it is mishandled, the result is going to be that at some point down the road, corrective action will be necessary. When that time comes, conceivably within the next administration, this whole issue will be opened again, and its opponents will have a whole new opportunity to try to destroy this vital initiative.

Without inputing any particularly Machiavellian motives to the current leadership, I do want to show that their actions are inconsistent with the well being of our Special Operations Forces and in my judgment, intentionally so.

To review briefly, it is important to note that this legislation was not passed until late 1986, long after it was palpably evident to all that our SOF capabilities were deficient and had to be corrected;

long after it was clear that the Department of Defense, left to itself, could not or would not bring the required changes. So it was not precipitous.

It may also be worth noting that the Senate in which this legislation was passed was controlled by the Republican party. So it was not partisan.

It was rather, a product of a bipartisan exasperation at the implacable indifference, if I may coin a phrase, of the Department of Defense toward any but its own internal parochial interests.

The purity of motive which informs this legislation can also be seen from the fact that there is no political benefit whatever to be gained from support for Special Operations Forces. There is no pork in it. It is a very low budget item. It is best thought of as a peculiar sort of weapons system, unusual in that it relys on highly trained manpower rather than firepower and technology for its effect. Unusual in that it is dirt cheap, still less than one-half of 1 percent of the total budget—a massive jump from the one-tenth of 1 percent when our efforts began. Interesting in that its governing characteristics in the low intensity dimension are essentially nonlethal.

Success is not determined by body count, as if it ever was. More interesting because if used proficiently and in a timely way we believe, all things being equal, that Special Operations Forces may prevent a resort to weapons systems that are very expensive and very lethal. They can do this while preserving that much of the globe that remains at liberty, and even do it in ways that are disagreeable to our Communist adversaries.

I am not sure that we can come up with anything better than that. I mention all this to reemphasize that the passage of this legislation can hardly be ascribed to any political motive other than common sense.

Yet, the Pentagon opposed the legislation at first dismissively, and at last frantically. Indeed the leadership became so desperate that they conceived overnight a plan of their own to correct problems which they had insisted for nearly 6 years did not exist.

In the end, the legislation passed anyway. Whereupon those who were put in charge of defeating the legislation were put in charge of implementing the legislation they had failed to defeat.

It is difficult to escape the conclusion that they were being offered one more chance, isn't it?

The record so far suggests that they were taking full advantage of that second chance.

This legislation is not complicated. It calls for an Assistant Secretary for Special Operations and Low Intensity Conflict, for a unified command, for a position at the NSC, and for implementation with 180 days from the time the legislation was passed.

As of this afternoon, we are 15 days away from the date set for the implementation of this legislation.

There is a unified commander designated at long last, but he remains unnamed for reasons of protocol. I understand that the White House pointed out to the Pentagon that it could not designate the commander until it had first designated what it is he is to command. Since the one has yet to be attended to, the other must be delayed.

Apparently there is no position established at the NSC. It is not clear that that can be done under law. I am not familiar with that. It would be useful to know if there is an intention to establish the position as suggested by the legislation.

We do know there is no Assistant Secretary designate for Special Operations and Low Intensity Conflict, and here is a matter to engage our interest, Mr. Chairman. The search for an ASD has been a thing to behold, as it is being conducted again by the same office, the office of Assistant Secretary of Defense for International Security Affairs, which led the effort to defeat the corrective legislation.

As nearly as can be determined, the principle criterion for the new ASD for Special Operations and Low Intensity Conflict is that he should be acceptable to the existing ASD for International Security Affairs.

This has produced one candidate whose poor health had already required that he resign from a Pentagon post far less stressful than I can assure you this one is going to be; another whose chief qualification seems to be that he is from California; another who was put out of the United States Military Academy, and who apparently still managed a 30 plus year military career, rising to three-star rank while being inconvenienced no more than 10 months in Vietnam throughout the roughly 15 year span of that war; at least two contenders who advertised themselves to the Secretary of Defense by assuring him that they didn't believe the legislation should have been passed either; and there's Larry Ropka.

It has also produced a waste of 164 days out of the allotted 180 in producing an Assistant Secretary for the purpose.

I will not presume to speculate on what was in the mind of the Congress when it mandated an interim status report on efforts to implement this legislation, but this provision would bear the interpretation that the Congress was not completely confident the Department of Defense could be counted on to obey the law.

As we know, the report due on February 16 and finally sent forward on February 20 was little more than a thinly veiled gesture of contempt. The substance of the report has already been discussed, from the fraudulent issue of relief from title 10 to the decision to put the command in Florida, to the decision to put the Assistant Secretary and staff in Rosslyn in a building where the lease expires in 18 months, and so forth. I will not dwell on these matters at this moment.

I would note one omission which I hope the committee will pursue with tenacity, and that is the absence of any reference to who shall have responsibility for dealing with terrorism, and how that responsibility is to be met.

If it is intended that this matter be couched under the Deputy Assistant Secretary for Low Intensity Conflict, then I urge you to have that made explicit so that the subject does not drift off into the hands of people who know absolutely nothing about it.

I would note an inclusion that is as interesting as the above omission. This involves FYDP Program 11, which would aggregate all SOF funding programs for DRB treatment in a single package.

According to the Defense Department submission of February 20, quote, we are creating a major force program category within the

5-Year-Defense Plan for Special Operations Forces, FYDP Program 11.

According to Mr. Armitage's testimony today, on March 27, 1987, the Deputy Secretary of Defense directed the implementation of major force Program 11 for Special Operations Forces with the 5-Year Defense Plan FYDP Program 11.

According to Mr. Armitage's testimony on August 5, 1986, when he and Admiral Crowe were here peddling a panacea to avoid legislation, quote, we have taken steps rather recently. We have given Program 11 status to SOF.

I am puzzled, Mr. Chairman, about the fact that so many things we were told has happened or could happen or would happen last August seem to be happening again.

I remember President Johnson used to say that America is a constant becoming. With the crowd running the Pentagon, Special Operations Forces is constantly becoming too. We can only pray that someday it gets there.

Now the final issue of the February 20 status report. It elicited expressions of bipartisan concern for the members of this committee as well as the relevant House committee. It also elicited expressions of deep dismay from the Secretary's own Special Operations Policy Advisory Group. I think you may be familiar with some of the memoranda sent forward by the various members. They are similar in most respects, but one centers on a point.

One centers on a point which is revealing, and I want to share it with you.

Unfortunately, I think you are not going to be able to read that from there. I will read you the, nobody can, good, well I will fill in here.

Let me just point out that this is a memorandum from General Richard Stilwell, a member of the SOPAG, who observes there are major policies to be urgently established, guidance to be provided to the JCS, defense positions to be advanced in interagency fora, and key members of the SO/LIC staff section to be selected and groomed. Despite his high sense of dedications and heroic efforts to fill the vacuum, Larry Ropka simply cannot be fully effective in the discharge of these important tasks. Indeed, it is rather unfair to place these burdens on his shoulders. It is no less unfair to preempt the ultimate incumbent's right to select his key subordinates as we understand to be the plan.

[The memo follows:]

GENERAL R.G. STILWELL (RET.),
Arlington, VA, 9 March 1987.

Memorandum To: Secretary of Defense.
Subject: Special Operations Reorganization—Information Memorandum.

As members of your Special Operations Policy Advisory Group (SOPAG), we submit our assessment of the report on Special Operations Reorganization which you forwarded to the Congress on February 20.

As a general comment, we consider the overall tenor of the report to be disappointingly tentative. We base this judgment not only on what is contained in the report but also on what is omitted. Certainly, outsiders can reasonably conclude that the Department is not moving out with customary efficiency to implement the Congressionally mandated reorganization. Compliance with the letter of legislation is one thing; acceptance of its underlying rationale is quite another. And the evidence does suggest that your components have not yet reevaluated the significance of the Special Operations role in the execution of national security policy.

This said, we have two specific comments. The first has to do with the location of the USSOC flag. Had we been asked for an advisory, we would have opined that the reasons for selection of McDill Air Force Base were far from compelling and outweighed by disadvantages. Certainly, the first two CINCCENTS were able to maintain single-minded emphasis on the discharge of their substantive command responsibilities while functioning from temporary facilities. Given the sensitivity, political/military character and fast-breaking challenges to which USSOC might have to respond, the optimum location for the headquarters is clearly the national capital area. One of our members, General Robert Kingston avows that the decision to locate at McDill is fatally flawed.

Recognizing that the die is cast, your Committee urges that provision be made for a substantial and permanent liaison and planning element of the headquarters in the Pentagon itself. This will allow for continuous, indispensable interaction of USSOC with key players in your own and Admiral Crowe's offices as well as with other concerned agencies of government; and provide working space for CINCSOC and battle staff in times of crisis.

Our second comment has to do with the delay in selecting, positioning, and chartering your principal assistant for Special Operations/Low Intensity Conflict. We fully understand that that individual cannot be made an Assistant Secretary of Defense until the Congress amends Title 10 to authorize an additional ASD position.

Mr. Koch. We are convinced that there are competent and experienced individuals ready to assume the reins of leadership now.

We urge that you expedite that selection.

Needless to say, the selection was not expedited, but the key point is the matter of the incoming Assistant Secretary having his right to chose his staff, preempted by those who fought this legislation and have crippled it in its implementation.

It is key, because it has directly to do with whether the Department of Defense is trying to torpedo the law, as we contend it is.

I want to read you the whole cover memo, the handwritten cover memo with which this was transmitted, the Stilwell memo was transmitted to Armitage.

[Memo follows:]

This is General Stilwell's letter to SECDEF which is a little different than the original and includes a report card on me. I am not concerned about his view of me because the many actions you took with SECDEF and CJCS are invisible to him and must remain so. I think he would be happier if I had authored a number of stern memos to and through the SECDEF to JCS. Also (note underline) selection of key staff are high on his mind. He will not get his way so long as I have anything to say about it. At any rate lets not make a fuss about this. I invited him to lunch today (before he dispatched this (lunch 11 Mar) and I will attempt to cool his passion. How's that for egg?

L.R.

Mr. Koch. It says this is General Stilwell's letter to SECDEF, which is a little different than the original and includes a report card on me. I am not concerned about his view of me because of the many actions you took with SECDEF and Chairman of the Joint Chiefs of Staff are in invisible to him, and must remain so. I think he would be happier if I had authored a number of stern memos to and through the SECDEF to JCS. Also selection of key staff are high on his mind. He will not get his way so long as I have anything to say about it. And so forth, I invited him to lunch today before he dispatched this and I will attempt to cool his passion.

The important sentence fragment here Senators, says selection of key staff are high on his mind, that is General Stilwell's mind, and he will not get his way as long as I have anything to say about it. It does seem to me that the question has already been raised, doesn't the incoming Assistant Secretary for Defense, oughtn't he to have the right to chose his staff? Clearly there are those who think that he should not.

To appreciate this fully, we need to consider the fact that Messrs. Ropka and Armitage are, and have been, interviewing their own candidates regularly for positions on the staff of the Assistant Secretary for Special Operations and Low Intensity Conflict. When that point finally comes to pass, the individual who comes to it may be handed a deck prestacked by those who fought to prevent this legislation from ever coming into existence.

This is some of the documentary evidence Mr. Chairman, there is a bit more, and the remainder, such as things as loyalty lectures to members of the special planning group——

Senator **KENNEDY**. I am going to give you just another minute or two.

Mr. **KOCH**. Yes sir, I am just about to conclude.

It is pointed out in these lectures that a too ardent obedience to the objectives of this law are not consistent with the demands of loyalty to Pentagon leadership. And that the man who deserves this loyalty is the man who signs their paycheck.

The irony of all this is that the Secretary of Defense, Mr. Chairman, originally supported this effort to restore our Special Operations Forces. It was not sufficient to get the job done. It required this legislation. I would say to the question of micro-management, which is frequently raised, that we have been presented with two choices. One is either micro/management or no management at all.

With all respect to Secretary Lehman, the Pentagon doesn't need 600 ships, it needs a damn rudder.

I will conclude with that.

Senator **KENNEDY**. General Meyer.

STATEMENT OF GEN. EDWARD C. MEYER, U.S. ARMY (RETIRED)

General **MEYER**. Thank you, Mr. Chairman. I have a statement which I would like to have entered in the record.

I would like to have the opportunity to make some comments. I appreciate the opportunity to be here this afternoon to talk about something that I have been involved in for a long time, Special Operations Forces and low intensity conflict.

I think it is important that this particular committee address this issue, because how low intensity conflict is resolved and how Special Operations Forces are developed is going to determine what our Nation needs in the way of conventional forces and whether or not someday we must become involved in, or go to conventional or nuclear war. It is also going to determine the size of the projection forces and the regional defense forces.

I noted in my statement that I am belatedly hopeful despite the gloom overlaying Mr. Koch's testimony. I have become belatedly hopeful within the past several days as the Defense Department rushed to cheat the hangman.

It appears to me that the visible roadblocks to the creation of a truly integrated Special Operations Force have been moved aside sufficiently to permit the Defense Department with your support to begin what is going to be a major long term effort.

Despite being hopeful, I would opine that the reason we have been able to get answers to the critical questions asked of the Defense Department has been a result of three groups: one, the Congress, holding the Pentagon's feet to the fire; two, the actions of Admiral Crowe and General Kelly; and then three, I believe, and this may come as a surprise to some around here, I believe that it is also because Mr. Weinberger has finally gotten into the issue and decided belatedly to make decisions to push it in the direction that it needs to go.

Now despite being hopeful and passing out kudos, the Special Operations command has a long way to go. There are many hidden roadblocks and trap doors. Many of those are the kind that Neil Koch has outlined.

It is going to take several years for Special Operations command to be developed, and it is going to take that because of the inattention of the past.

The key factors in determining whether or not we are going to have a viable Special Operations command are the people, the resources, the organization and the access and attitude.

I have provided all of you with a handy dandy check list and I am going to go through that check list because it is a check list that you should use as you question the witnesses here. I am going to use it as my check list to tell you where I think we are today with regard to the Special Operations command. I promise you I can do it within 10 minutes.

First of all on the people side of things, do we have qualified individuals assigned to key billets in the OSD, Joint Staff, the Special Operations command and in the CINC staffs? The answer today is clearly no! You have already heard today the current status of the commander of the Special Operations command and the Assistant Secretary of Defense. The qualifications of the individuals is important, as is the fact that qualified people be assigned to all of the various elements.

Is the total staffing adequate to carry out the missions? I don't know. The SOPAG was uncertain when we looked at it. Clearly that is something which the commander of the Special Operations command is going to have to answer directly, as is the Assistant Secretary of Defense when he is assigned.

My judgment is that the staffing is a little short of personnel, but it is so important that we get on with the organization, that you should insist that the individuals selected come directly to you and provide you with advice on the adequacy of the staff.

I have listed some other questions which you are going to have to ask in the next 6 months to a year. They have to do with the people themselves and how they are being used. Whether or not a career pattern has been established for them, whether or not there's a training and education system in place, and whether or not they are being promoted equitably.

The second issue is resources. Is Program 11 being supported? That is what will be critical. You have to have, as all of you know around here, money, and if Program 11 is being supported then I would feel confident that we had an opportunity to develop the kind of Special Operations command that we need.

It is necessary to ensure that the commander in chief of the Special Operations command is the major contributor to Program 11. That is where the basic advice must be provided.

The services must set up special procedures to provide for Special Operations Forces needs. If they use the current procurement procedures, the Special Operations command will wither on the vine. Six years is too long to wait for a piece of equipment that you need for this organization.

We must provide organic mobility for the force, and we also must provide a unique logistics system to support it.

In the organization area, ask the question as to whether the CINC can command the forces adequately as organized. His response will indicate whether the headquarters is properly located.

If only a liaison element is in D.C., that will be inadequate. The ideal situation would be to have the whole command here. If, for financial reasons the decision is taken not to put the whole command here, I would say that at least the Deputy Commander or the Commander himself ought to be stationed here. Because in addition to the requirements of ensuring that the geographic and functional CINCs know what is going on in the Special Operations area, the commander is going to have to also protect in the infighting that takes place here in Washington if he is to be successful.

The commander should let you know whether or not the location of the headquarters creates a problem. And if so, he should be able to move a larger element to the D.C. area, if the decision is taken to put it at MacDill.

Another question is—are all the appropriate forces assigned to SOC? That is a question you should continue to ask the CINCs as well as the Special Operations command commander.

I personally believe the Naval Special Warfare group needs to be assigned to SOC for several reasons.

One is because we have consistently had a readiness command without a Navy. The readiness of our joint commands suffered from this shortfall. The Special Operations Command should have the unique capability and understanding of naval operations that the Navy brings to special warfare, totally integrated into the Special Operations command.

In addition to mobility and logistics, two things that this organization needs is the best communications in the world and a very, very unique intelligence gathering capability. I know General Gorman has spoken in the past to you on intelligence needs.

On access and attitude, a question to ask is, do the commander and the Assistant Secretary of Defense have access to decision makers? They are going to have to have free access to the people who do in fact make the decisions.

The point that you raised, Senator McCain, with regard to geographic commanders properly integrating SOC forces is going to be a vital issue. You should ask each unified commander who appears before you, how is he going to use Special Operations Forces. Until we get answers from all the CINCs, including the SOC commander, we are not going to have a responsive program.

The creation of SOC is likely to create schisms within the military itself. Within the Army, for example, in visits out to Fort Leavenworth, one of the members of SOPAG received a very clear signal that the average Army officer believes that the Army is going to create a group of elitists. That is something that has to be very carefully watched, and everybody should understand that possibility.

The next three points on the checklist I consider to be very critical. They are beyond the ken of the Department of Defense. However, effective Special Operations Forces and low intensity conflict resolution will not occur without some element of Government above than the Defense Department orchestrating it. Success requires the integration of all the resources of our Government. That is why the requirement for a low intensity conflict board and the requirement for a Deputy Assistant to the President for Low Intensity Conflict is so important. Also we need some mechanism to ensure that we periodically have war game contingency scenarios such as Margaret Thatcher in Great Britain does with regard to counterterrorism. All of the elements of Government knowing how to respond to low intensity conflict is important if we want this organization to work. Just having a very good military force is not going to solve the problem.

I have hastily shown how I believe you might use the check list that I have provided you.

There is one other area, with regard to Special Operations Forces, that I would like to talk to. That is low intensity conflict. You can have good Special Operations Forces and you may or may not do well at low intensity conflict. Low intensity conflict and Special Operations Forces are not synonomous. We have to be able to use the Special Operations Forces in low intensity conflict. Today we are flat on our gazoo in understanding how to succeed in low intensity conflict. I have provided you with a diagram of a system to use in determining the needs for conducting low intensity conflict.

Since low intensity conflict is a multi-agency issue, it needs an agreed upon concept of operations. We need to analyze the various missions of unconventional warfare, counterinsurgency, drug interdiction, peacekeeping, peacetime contingencies, technology transfer, countermeasures, counterterrorism and others, and then develop the doctrinal requirements, the international agreements and so forth that are required.

I think that we have the opportunity to create a Special Operations command of which we can be proud. We have the opportunity to develop the awareness of low intensity conflict that would give us some confidence that we would be able to develop the forces that would permit us to win all low intensity conflicts and thus make it least likely that we would have to be involved in conventional or nuclear war in the years ahead.

Thank you, Mr. Chairman.

[The prepared statement, checklist, and diagram of system of General Meyer follows:]

Prepared Statement by General Edward C. Meyer, U.S. Army Retired

Mr. Chairman, Gentlemen. Thank you for the opportunity to address this committee on an issue so elemental to your charter. For how well our nation prepares for Low Intensity Conflict, and how professional our Special Operations Forces become will be major determinants in the composition and numbers of military units required for Projection Forces and Regional Defense. Not just incidentally it is also a major determinant as to whether or not our nation might have to engage in conventional or nuclear war.

I must say at the outset, that I come to this hearing with a sense of hopefulness that I did not have several weeks ago. It appears to me that the visible roadblocks to the creation of a truly professional Special Operations Force have been moved aside sufficiently to permit the Defense Department to begin what will be a major long term effort.

There have been three groups responsible for moving the roadblock—this committee and the other Members of Congress who have supported creation of a Special Operations Force, the Chairman of the Joint Chiefs of Staff and General Kelly who have had to overcome many service raised obstacles, and the senior leadership in the Defense Department who have been responsible in the past few weeks for resolving some of the critical issues.

Having expressed my hopefulness, and having passed out kudos however, does not mean that I believe the Special Operations Forces are ensured of success. There are still many hidden and not so hidden roadblocks to successful creation of a Special Operations Command. Additionally the development of such a force, with the capability required to ensure a high likelihood of success when employed, will take several years. Correcting the inattention of the past will take time.

The key factors in determining whether we will have the sort of force needed to operate in this special milieu will be personnel, resources, organization, access and attitude. At Inclosure 1 is a check list which I propose you consider for use in future hearings designed to determine the status and readiness of Special Operations Forces. It is not an all inclusive check list—but if refined should provide the insight you need to determine whether or not the Special Operations Command is alive and well. Using the attached checklist (Inclosure 1) I will provide my assessment of the current status.

There is an aspect to this issue which we have not been specifically asked to address today—Low Intensity Conflict. However, since the new Assistant Secretary of Defense's title is "For Special Operations and Low Intensity Conflict" I feel free to comment on certain aspects of Low Intensity Conflict. While we may develop a professional Special Operations Command, that provides no assurance that we will be effective at Low Intensity Conflict since Low Intensity Conflict and Special Operations Forces are not synonymous. Special Operations Forces are merely one element available to be used by theater commanders and the national command authority in conducting Low Intensity Conflict.

It is still uncertain to me exactly how the Defense Department and the National Security Council intend to approach Low Intensity Conflict. Since we are already engaged in such conflict all around the world, becoming professional at the art of war in this milieu is a first order priority for our national security community. If the strategy, doctrine and tactics necessary to win in this environment are not developed and supported then special operations forces, conventional forces and all elements that might be employed in such operations are likely to be wasted.

The Defense Department needs to explain more clearly how Low Intensity Conflict will be addressed. I have appended a chart which outlines an approach toward systematically analyzing this issue (Inclosure 2). I will not claim that is the only approach, I merely argue that today we have no coordinated approach toward Low Intensity Conflict—among the services, among geographic unified commanders or among the departments and agencies of government.

General Galvin, the nominee to replace General Rogers as CINCEUR and SACEUR, is the most knowledgable individual in service today on this matter. In his new assignment he will be able to integrate U.S. responsibilities for Low Intensity Conflict with his other U.S. and NATO defense responsibilities. In General Galvin our nation has a unique military asset. He understands the entire spectrum of warfare. I would recommend that you seek his advice on this matter as well as on what have been the more obvious areas of interest historically in NATO.

If commanders of unified and Specified Commands, the JCS, the Services, the Secretary of Defense, and the National Security Advisor to the President cause this effort to receive top down support then I will feel not only hopeful but confident that the U.S. can become professional in today's and tommorrow's number one war. And by becoming professional we can ensure that low intensity wars can be contained sufficiently that we need not worry about such conflicts being the trigger for conventional or nuclear war.

Inclosures follow:

SPECIAL OPERATIONS COMMAND CHECK LIST

Personnel:

Are qualified Individuals Assigned to key billets in OSD, Joint Staff, USSOC, CINC staffs?

Is the total staffing adequate to carry out missions?

Has a system been established to manage careers of SOF personnel?

Has a training and education system been established for SOF personnel?

Are SOF officers, WO's and NCO's being promoted equitably?

Resources:

Is Program 11 being supported?

Is CINCSOC the major contributor to Program 11?

Have the Services set up special procedures to provide for SOF needs?

Have adequate organic mobility resources been provided?

Have unique logistic support systems been established?

Organization:

Can CINC command forces adequately as organized?

Does the location of headquarters create organizational difficulties?

Are all the appropriate forces assigned to SOC?

Has adequate communication capability been provided?

Have adequate intelligence capabilities been provided?

Access and Attitude:

Do Commander and ASD have adequate access to decision makers?

Have the geographic commanders properly integrated SOC forces?

Has the creation of SOC created schisms in military?

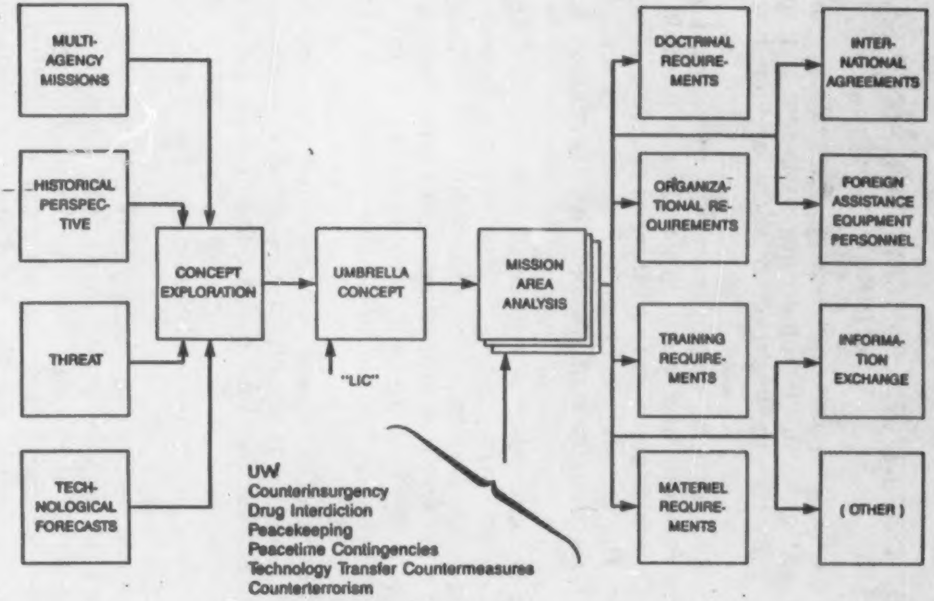
Has the board for LIC been established within the NSC?

Has the President designated a Deputy Assistant for LIC?

Has a mechanism been established for all elements of government to periodically war game likely contingency scenarios?

Are Services supportive of SOC?

LOW INTENSITY CONFLICT MISSION AREA ANALYSIS


MULTI-AGENCY MISSIONS
HISTORICAL PERSPECTIVE
THREAT
TECHNOLOGICAL FORECASTS
CONCEPT EXPLORATION
UMBRELLA CONCEPT
"LIC"
MISSION AREA ANALYSIS
UW
Counterinsurgency
Drug Interdiction
Peacekeeping
Peacetime Contingencies
Technology Transfer Countermeasures
Counterterrorism
DOCTRINAL REQUIREMENTS
ORGANIZATIONAL REQUIREMENTS
TRAINING REQUIREMENTS
MATERIEL REQUIREMENTS
INTERNATIONAL AGREEMENTS
FOREIGN ASSISTANCE EQUIPMENT PERSONNEL
INFORMATION EXCHANGE
(OTHER)

Inclosure 2

Senator COHEN. General Wilson.

STATEMENT OF LT. GEN. SAMUEL V. WILSON, U.S. ARMY (RETIRED)

General WILSON. Senator, my statement consists of some six items or observations that I singled out as being of importance to me. I would simply like to flag them quickly for your possible interest.

Item No. 1: As a private citizen now for 10 years, I regret that this legislation became necessary, since in my humble opinion it borders on overinvolvement in the internal operations of the executive branch by the legislative branch. But as a Special Operations professional, I have to recognize that the legislation had become necessary.

Despite the recognized importance of the role and the required capabilities of Special Operations Forces, we simply were not meeting the requirement. In a word, as of last fall, when this initial legislation was being written, our overall Special Operations Forces capability, especially in long-range, rotary-wing airlift support for SOF, was below what it had been for the unsuccessful Iranian hostage rescue mission.

The Department of Defense, for whatever reason, had let the matter of developing a truly effective special operations capability slide too long. Something had to be done. This legislation became necessary. As a private citizen, I can only hope that it does not establish a precedent for overinvolvement by the Congress in executive branch affairs.

In this same connection, in the SOPAG comment on the interim progress report already referred to in this hearing, we note that the lack of progress since last October in implementation of this legislation has also confirmed the need for legislation in the first place. Further, it highlights the need for the particular kind of monitoring which is taking place in this room right now, to insure that pressure is kept up to make things happen.

Item No. 2: A number of us are concerned that during this period of Special Operations Force reorganization, we may be more vulnerable than usual to overseas situations requiring the deployment and the commitment of Special Operations Force elements.

That is, if a sudden contingency in this area were to occur, it might catch us in the act of "changing horses," which could mean our inability to respond with the requisite effectiveness.

In other words we are right now in a vulnerable period, and we therefore need, I believe, to proceed to completion of the changeover with far greater dispatch than that which is reflected in the SECDEF progress report of February 20. It is especially critical to have the key players nominated, confirmed, and in position as soon as possible.

In this connection, I would note that a week ago I was at the Air University, Maxwell Air Force Base, lecturing on crisis management to a group of 15 generals and flag officers. I gave them at the end of the lecture a little worksheet which reflected the following question: please list in descending order of importance your selection of the five areas most likely to produce crises in the next 18 months.

After we spent some 20 minutes discussing their selections, I asked them how many of their crises on each respective list fell in the area of low intensity conflict. Four out of five of the contingencies chosen fell clearly within the low intensity conflict area. And each of these officers agreed that the forces initially to be employed would no doubt be Special Operations Forces.

Item No. 3, a subject that we have not spoken to today. I think it is important to make special note of the placement of psychological operations in the new command. While psychological operations support is particularly vital on Special Operations missions, I think we have to recognize that PSYOP is a full-spectrum, supporting weapons system for the entire range of military and naval operations at all levels.

In my own view, however, a continuing close association of PSYOP Special Operations (which association is a matter of historical happenstance) for administrative and logistical purposes should in no way constrain PSYOP capability to fulfill its other more conventional missions. I think noting this point is important.

Item No. 4, more observers tend to focus on the more dramatic direct action missions of Special Operations Forces. The surgical strike, the "surgeon" role, and sometimes overlook the more mundane and equally, if not more important advisory missions of Special Operations Forces—the "preventive medicine" role.

Given the additional premium placed on language proficiency and cross cultural communications skills in Army special forces for example, along with emphasis on individual maturity for these particular troopers, these teams are fully capable of performing, like an "armed Peace Corps" in their low-profile advisory function, stressing the nation building role of indigenous military forces as exemplified by the legendary General Ed Lansdale and President Magsaysay with the Huk-Balahap campaigns in the Philippines in the late 1940's, early 1950's.

Special Operations Forces are not the only players, of course, in this advisory role. But they do have a major contribution to make, which must be taken advantage of, and which should not be overlooked as we look at the greater drama of the direct action missions.

Item No. 5, with one more to go:

One of the most serious deficiencies in this Special Operations Forces low intensity conflict arena is the absence of a comprehensive joint doctrine.

For example, direct action missions of our Special Operations involve very simply a three-step dance. Get there; do it; and get back. No single service can accomplish this entirely by itself. Thus, their very nature, those three steps involve jointness. And we are woefully weak in the area of joint Special Operations doctrine. We are still mired down in the lessons of World War II. We tend to read too much Clausewitz and not enough Sun-Tzu.

Now, I believe that the right people are beginning to come alive in this area, to recognize the problem and to lay plans to do something about it. But it remains a problem. And we cannot overlook it as a priority problem.

The last item is an encouraging note: Five members of the SOPAG met 2 weeks ago with General James Lindsay, presently the Department of Defense Executive Agent for Planning for the new Special Operations Command and listened to him brief plans and recommendations he had developed since his appointment on the sixth of March.

General Lindsay is tackling this problem in a highly sensitive, surefooted way, moving in comprehensive detail from problem to problem and issue to issue. He is not hesitating to seek help from a number of quarters. He is involving everyone who has a stake in this game. And importantly he is beginning to get people of diverse views to begin to cooperate, and he is starting to allay some of the fears and suspicions that unfortunately still surround the subject.

For example, he has been emphasizing to the overseas unified commanders that the Special Operations command mission is primarily to provide support to the overseas CINC, rather than having CINCSOC supported by the overseas CINC. I came away from that session with General Lindsay much more heartened and encouraged on the subject than I have been for years. I think that kind of presentation by General Lindsay at some point in the future might go a long way to allay your possible concerns and your fears.

Thank you.

Senator COHEN. Thank you very much, General Wilson.

Well Mr. Koch I would perhaps turn to you. We have two of the witnesses at the table who appear somewhat optimistic about some of the changes that they perceive taking place within the Pentagon. You remain it seems to me, rather pessimistic about what you have seen to date.

Is it that they are aware of things that you are not, or they see it differently having worked in the civilian position yourself?

Mr. KOCH. No, I think our awarenesses are roughly the same, Senator. I am not sure. Either they were informed coming in here or informed earlier on about the Program 11 iteration which is something we all take heart from. The only thing that concerns me about it is the fact that we were told last August that this thing was being put in Program 11, and it didn't happen. So one tends to find optimism where one can.

I talk to people in the Pentagon on a regular basis as probably is obvious, and get a sense, as I think your staff does and so I leave it to you whether or not there is much reason for optimism, as may seem to have been expressed, although I must say I don't think either of my colleagues indicated that they felt this battle was over. And that everything is going to be fine from here on.

Senator COHEN. Well I am going to ask the Chairman to include your letter to me last year, and a copy of the Low Intensity Conflict Project final report executive summary of August 1, 1986, in the record, but let me just read a portion of the letter you wrote last year.

You said in that letter: "In the effort to defeat the SOF legislation, I am watching the same predominating selfish interest at work and have no doubt that their success can only lead somewhere sometime to some other replay of Beirut, October 23. So it would seem to me after all, that not to speak out would only be to compound the wrong, for without correction others will surely die and for the same craven purposes and from those who did die we take no lesson but would waste their lives twice."

Do you have a different perception today than you had when you wrote that letter in terms of what has taken place on the SOF legislation?

[The material referred to the follows:]

The Honorable William S. Cohen
United States Senate
322 Senate Hart Office Building
Washington, DC 20510-1901

Dear Senator,

As the Congress nears a decision on legislation to correct deficiencies in the management of our nation's Special Operations Forces (SOF). I want to share with you my thinking on the subject.

As you know, I spent over five years in the Pentagon, with responsibility for overseeing the revitalization of these forces, as well as for our anti-terrorism and counter-terrorism roles. These efforts were not without success. That much of the record that can be known is known, and while I take some satisfaction in it, I won't dwell on it here, except to caution that in the area of resources it be kept in perspective: what we have been able to get budgeted for all our SOF requirements after five years of hard work, (ie. not quite $1.7 billion for FY 87, up from $441 million when we began) is still $100 million less than the Army lost on just one unworkable weapons system.

The cost of the success we were able to achieve is not especially well known. It did not come easily, of course, and each forward step only seemed to harden the resolve of those who have steadfastly opposed SOF. Resistance took many forms. Dishonesty was one of them. When it seeped into the decision-making processes at the OSD level, I decided it was time to go, and tendered my resignation.

In going, I determined not to look back or to second-guess those who would continue those tasks for which I had been responsible. I assumed that they would at least work toward those same goals which had shaped our efforts for five years, however they might do so in a different manner. Having watched their efforts over the past several months, I know I cannot keep my departing resolution to hold my peace. The management of Special Operations Forces must be corrected; it must be corrected by legislation, because it will not be corrected otherwise; and the Congress must not be persuaded to give the Pentagon "a few months" to show that at long last it is willing to correct the deficiencies on its own, because the moment will pass, the Congress will move on to other matters -- not least, an election year -- and the failings will continue.

More, those who have worked for the restoration of our SOF capabilities, particularly those in the uniformed services who have so often put their own careers at risk for what they believed, and those who have taken hope from the support of people such as yourself, Senator Goldwater, Senator Nunn, Senator Rudman, Congressmen Dan Daniel and Earl Hutto and others, will lose hope in the possibility of restoration, while those who have opposed these efforts will be strengthened in the arrogant conviction that nobody can make them do what they don't want to do, or stop them from doing what they do want to do. It would be difficult to calculate the costs to the national interest of further reinforcing this conviction. It is already nurtured quite sufficiently by civilian reluctance to challenge it.

Were it not for the inconvenient fact of John Lehman, we might all well have long ago accepted the conventional wisdom that the military services are simply unmanageable and its nobody's fault. The Lehman lesson is that the military can be managed, but it requires first remembering who the Constitution put in charge of the military, and second, daring to lead. Not for nothing is the Navy the one bright spot of virtually unblemished accomplishment in the restoration of our SOF. Unfortunately, that brightness only further illuminates failure on other fronts.

These are generally well-known, and need no lengthy recitation. Briefly, they include the ongoing effort ultimately to divest the Air Force of a mission vital both to our Special Operations capability and, more , to our counter-terrorism capabilities. As you know, we have fought this for two years, and the effort has produced more changes than Imelda Marcos' closet; I don't know what is OSD's most recent decision on the subject. If we are to retain the mission capability we must have, and yet establish that capability within the Army, as proposed, rather than in the Air Force where it now resides and is ably performed, it will cost, by realistic accounting, well in excess of a billion dollars. With all the complaints about Gramm - Rudman, it is difficult to understand how we can afford a billion dollar caprice to recreate in one service a capability which already exists in another.

We know of the MC-130 Combat Talons. In 1979, the need for some twelve additional planes was certified. The Air Force has managed to slip procurement every year since then. This program has had, at last count, seven project managers in the last three years -- hardly a sign of serious intent on the part of the Air Force. We have yet to bring one new aircraft on line. Sooner or later we will pay the price of a mission failure, or a bad accident, with the old aircraft.

We know of overused aircraft falling apart in the air. I remember a recent effort to dispatch a team on a counter-terrorism mission. The team was to assemble at 2200 for wheels up. They were there. The plane broke. It took four hours to bring another plane in. It broke, too. Three planes broke that night. (Ah, but it will be argued these were not Special Operations assets. True.) We know that when the Air Force got fed up with being criticized for failing to correct the deficiencies in their Special Operations airlift posture, we held a Secretary's Performance Review to see what was the merit of the criticism. We found that Air Force Special Operations airlift capabilities were commonly in C3 and C4 status over extended periods of time.

We know Grenada may well have cost more in US military lives than it needed to have done, due to the manner in which it was planned and directed by the Joint Staff.

We know the mendacious mockery made of Sec .152 of last year's Appropriations Act, which sought to direct the Pentagon to explain how it was going to correct its SOF airlift shortfalls by 1991.

But I want to tell you of harder things, that fewer people know, about the cost of trying to advance our Special Operations Forces. The year 1983 is a particularly instructive example in this regard.

Early in 1983 I briefed the Secretary on problems in confronting terrorism. Without elaborating on that briefing, I will tell you that I made two points. One had to do with the inadequacy of our political-level command and control arrangements. The other had to do with the changing threat: terrorism was moving away from the hostage--barricade incidents which CT forces had become increasingly adept at resolving, we would see more emphasis on assassinations and large bombs, and we would have to adjust accordingly.

The Secretary was concerned and directed me to brief the Chiefs, formulate a unified plan of action and come back to him for implementation.

I informed the Director of the Joint Staff that I needed to brief the Chiefs, what I wanted to tell them, and what the Secretary wanted done as a result. I was told a time would be scheduled for the briefing. My recollection is that this was in early March. Every week thereafter we reminded OJCS that we needed to get on with this matter, in that it was urgent.

Finally, about mid-April, I got a response saying the urgency was appreciated, and a briefing would be scheduled. But first, I had to brief the OPSDEPS. As you know, those on the Joint Staff live in abject terror that an unsanitized fact will find its way before the Chiefs, who may then deal with it spontaneously and accidentally end up with one Service being advantaged over another, or some similar catastrophe.

So I briefed the OPSDEPS. I told them about command and control, told them the threat was shifting. They agreed the matter was urgent, and briefly discussed a course of action they would propose to the Chiefs, which required first their being briefed.

In this period, to punctuate the perception of a changed threat environment, the US Embassy in Beirut was blown up.

I went to Beirut with the group sent to bring the bodies home. En route we stopped in Frankfurt, where I picked up Colonel William T. Corbett, European Command's Special Assistant for Security Matters, and our top expert in Europe on defending against terrorism. In Beirut I satisfied myself that we had serious shortcomings, particularly in managing intelligence related to the terrorist threat. Corbett stayed behind to devise up-grades for the security of our forces; some were willing to accept his help, some were not. I returned to Washington and arranged through appropriate channels for a small survey team to go to Beirut and analyze our problems there.

The group went in quietly, did their work, came home and reported. They had done an excellent job. But militating against careful attention to their work was the fact that they were seen as having a Special Operations association, that their report reflected adversely on people who outranked them; and, finally, their work had been submitted with no opportunity for the military system to sanitize their findings. This led to denials, ass-covering, and all around outrage that the survey had been done at all. Thus, it was decided that there were no problems and, even if there were, they had been fixed. The report was swept under the rug.

Meanwhile, my efforts to talk to the Chiefs, to move the system, continued. May came and went, as did June and July, with OSD patiently and regularly reminding OJCS that the Secretary wanted this done, that the issues were of immediate importance, that the April bombing underscored the urgent reality of our concern, that the OPSDEPS themselves were agreed that this issue was important, and had agreed too that the Chiefs must be briefed before we could proceed to address the problem.

In August the answer came back. It was indeed critical that I brief the Chiefs, but there was one slight problem. Since the briefing in April, there had been personnel changes, and we had a new Director of the Joint Staff and two new OPSDEPS, and it would first be necessary to brief them. So I asked General Scholtes to come up from Ft. Bragg and together we went through it all again. This produced a slightly different plan of action, requiring first, of course, that I lay it out for the Chiefs. August passed, as did September. On October 23, the Marine Battalion Landing Team building in Beirut was blown up, along with 241 Marines.

In secret then, the Chiefs launched a study to discover those things that we had tried for nearly a year to tell them about terrorism. I never met with them. It is not even certain they ever knew we had wanted to meet with them.

You should be aware that on a separate track, throughout 1983, I was pressing those efforts which resulted in the creation of the Joint Special Operations Agency, as well as direction from the Secretarial level to the Services to move to correct our SOF deficiencies by 1991. The Joint Staff, including the Chairman's own office, persistently refused to coordinate on these directives, certain that this would prevent their being signed. To their amazement and unending consternation, the directives were signed anyway. There has never been the least doubt in my mind that our efforts on behalf of SOF in this period confounded our other efforts to address the above-mentioned issues affecting our terrorism posture.

Nor was there intended for there to be any doubt in my mind. I attempted to clear the air with the Director of the Joint Staff after the fact, so that we might have our disagreements over SOF, but do what needed to be done with regard to terrorism. I asked him how it could be possible that in the greater part of a year, no time could be found on the Chiefs' agenda to discuss the subject. I vividly remember his response, in the aftermath of 241 deaths. He said: "Well, you know, terrorism is an easy thing to ignore."

As for SOF, he told me this: "You guys think you can tell people what to do, but if they don't want to do it, they're not going to do it."

I never spoke out about the events leading up to the disaster in Beirut on 23 October. It seemed proper not to simply because it could only cause more pain to people already suffering the unbearable pain of the loss of people they loved. Internally, I made my views known. But who would wish to say to someone that their loved ones died because those to whom their lives were entrusted placed a higher priority on other interests . . . personal interests, career interests, bureaucratic interests? Better to agree, as we generally do, that it was nobody's fault, or maybe the Marine Commander on the scene, or maybe somebody in European Command, or maybe George Shultz . . . one thing was certain, and this was repeated endlessly: "It couldn't possibly have been anticipated."

Today, in the effort to defeat the SOF legislation, I am watching the same predominating selfish interests at work, and I have no doubt their success can only lead somewhere, sometime, to some other replay of Beirut, October 23. And so it has seemed to me, after all, that not to speak would only compound the wrong. For, without correction, others will surely die, and for the same craven purposes, and from those who did die we would take no lesson, but would waste their lives twice.

I do not believe the system which leads to such abuse is capable of correction by the individuals who run it. The proposal put forth by the Pentagon for addressing the current situation is very near to a prima facie case of contempt of Congress, and is its own best argument for strong legislation.

The paperwork that purports to explain the lengthy deliberations by which the Special Operations Forces Command proposal evolved is simply a slightly edited version of the material generated back in 1983 to explain to the Secretary why command of SOF should be stuck in a sub-command at REDCOM.

The Special Operations Force Command offers nothing we do not already have in the neutered Joint Special Operations Agency (JSOA) if JSOA had been permitted to do its work, if the excellent work it did do had been taken seriously, and if it had been permitted the necessary level of proponency. Repeatedly, it was argued by such men as former CNO Admiral James Holloway, General Leroy Manor, General Don Blackburn, General James Ahmann, General Richard Secord, and the Secretary of Defense himself, that this had to be a three-star billet to work. The Director of the Joint Staff insisted only a two-star billet was required, and that the Director of JSOA didn't have to fear being plowed under by his superiors. He did, and he was.

There is great concern in the Pentagon that there will be legislated an oversight position on the National Security Council. This would give added authority to efforts at that level to require the Department of Defense to accomodate to the national policy, which is to restore our Special Operations Forces. It is this oversight, from outside the Pentagon, which is most desperately needed if we are to be prepared to deal with the threats that confront us in the real world. The individual doing the job at the White House now has done brilliant work with very little to work with; he should have at his disposal the additional clout of a mandated position.

Finally, there must be an Assistant Secretary of Defense for Special Operations, and the language of the law should be very precise about that so it cannot be construed that the law is satisfied by putting Special Operations under an existing ASD. It is in this area that the Pentagon proposal is most frivolous:

> First, it argues that the responsibility for Special Operations should be under International Security Affairs because it is in the regions under ISA that they are most apt to be used. If the Department really subscribes to that rationale, then it should explain why the Strategic Defense Initiative is not being managed by Richard Perle, Assistant Secretary for International Security Policy, inasmuch as it is "in" his regions that SDI has its applicability. The Special Planning Directorate was never under ISA, but reported directly to the Under-

Secretary for Policy; in short, for the purpose, the Directorate was institutionally at the Assistant Secretary level. This should be codified. SOF needs an unencumbered, single-agenda proponent with some grasp of the matters for which he is responsible.

Second, it is important to note that ISA has had , and continues to have a very real responsibility in this matter, and that is to establish policy for dealing with low-intensity threats in ISA's regions. Year in and year out we have pointed to the failure to provide a policy for dealing in this area, insisting we could go only so far in the revitalization without a policy around which the military could then devise strategy, and from which would flow doctrine, manpower, force structure, procurement, and the other missing pieces of the SOF puzzle. This was ISA's responsibility; it has yet to be met, nor is it certain that it is even understood. It is, for example, unclear how or whether it is possible to reconcile the exigencies of the constantly invoked support for "freedom fighters" with the Secretary of Defense's "guidelines" for the use of US military power. In short, there is nothing to support the contention that ISA has some peculiar claim to Special Operations responsiblities, much less expertise, when it has consistently failed to meet the related responsiblities that it does have.

It will seem ironic that it was I who propounded the current arguments now being offered against most of the provisions of the proposed legislation. I always hoped against hope that it would be possible to resolve the difficulties confronting the restoration process without going outside the building. Yet, even confronted with the threat of legislative intervention, the Services, the JCS and the Joint Staff have been unable to produce anything more than a de minimus proposal that commits them to nothing, and can be unraveled at the first opportunity. However grim the circumstances, the system is incapable of self-correction even in its own self-interest.

I hope the peculiar importance of SOF in the present global environment will be taken into account in the Members' deliberations, so that concerns about how this corrective legislation accords with the Reorganization Act will not deter them from making the needed corrections.

Before closing, I should say that while I have referred often to "the Services," the Navy has never been less than forthcoming in every way during the revitalization effort. Moreover, by their peculiar role in SOF, some configuration needs to be found that does not remove them from their role in relation to the fleets.

Thank you.

Warm regards,

Noel C. Koch

JOINT LOW-INTENSITY CONFLICT PROJECT
FINAL REPORT

EXECUTIVE SUMMARY

> Much has been written about low-intensity warfare, but it remains an open question how much is understood. Of greater certainty is the fact that little of what is understood has been applied effectively.
>
> Caspar W. Weinberger
> Secretary of Defense
> 14 January 1986

> Low-intensity conflict is the prime challenge we will face, at least through the remainder of this century. The future of peace and freedom may well depend on how effectively we meet it.
>
> George P. Shultz
> Secretary of State
> 15 January 1986

GENERAL

This report addresses a major United States foreign policy and defense issue: how to defend threatened United States interests in conflict environments short of conventional war. Increasingly, our adversaries are confronting us with political violence short of conventional war to achieve their goals. If most forecasts are correct, this is precisely the form of conflict that will confront us in the years ahead.

Numerous senior leaders have expressed concern that we do not understand low-intensity conflict; that we are unable to fully use United States capabilities in this form of conflict; that we are not adequately organized to cope; and that our current efforts fall short of what is required for a prudent national defense. Paraphrasing former UN Ambassador Jeane Kirkpatrick, we are engaged in a struggle against our will, a struggle for which we are perfectly ill-suited.

On 1 July 1985, the Army Chief of Staff directed the establishment of the Joint Low-Intensity Conflict Project to examine this issue. Although the project team was primarily military, it sought and received the support and participation of the Department of State, the Department of Defense, the Joint Staff, the Central Intelligence Agency, and numerous organizations in and out of government. Two products resulted from this effort--the Joint Low-Intensity Conflict Project Final Report and the Joint Low-Intensity Conflict Project Resource Data Base. The latter is described in the preface to Volume I of the final report.

The organization of the report reflects the methodology used to address this complex issue. The initial chapters of Volume I (Chapters 1-3) describe the factors affecting this unique form of conflict: environment, threat, and current United States policy and strategy. Within that framework, current and historical operations were reviewed. That examination drove the development of operational concepts for the specific activities of insurgency/counterinsurgency, terrorism counteraction, peacetime contingency, and peacekeeping operations (Chapters 4-7). Those activities were analyzed in terms of eight critical functions, for example, development and tactical operations. Those functions are discussed in Chapters 8-15, and are the basis for identifying issues and developing recommendations. The functional issues were integrated to form the project's findings and conclusions (Chapter 16). Specific issue papers with recommendations comprise Volume II of the report. Findings focus on the civil-military nature of low-intensity conflict, as well as the military aspects of numerous issues.

Four themes prevail throughout the report: As a nation, we do not understand low-intensity conflict; we respond without unity of effort; we execute our activities poorly; and we lack the ability to sustain operations. The findings of the project are summarized within these themes.

UNDERSTANDING

Ironically, our concentration on the need to deter nuclear and conventional war has given rise to a lack of focus on low-intensity conflicts around the globe. Our adversaries have consciously turned to political violence to advance their political objectives.

Examining United States involvement in insurgency or other forms of conflict at the lower end of the conflict spectrum is often an exercise in ambiguity. The peculiar nature of low-intensity conflict, the diversity and murkiness of the individual and collective threats, the uncertainty as to our own role and purpose, and conflicting views and varied institutional interests create an atmosphere that encourages confusion and inaction at best, mistake and blunder at worst.

Many government departments and agencies of the United States fail to comprehend the nature of this type of conflict. They do not understand the special socioeconomic environment in which it occurs; the strategy employed by our adversaries; the relationship of political violence to other forms of violence; and the futility of reacting with policy and instruments developed for other forms of conflict.

Among the factors contributing to this lack of understanding are our perceptions that the nation and the world are either at war or at peace, with the latter being the normal state; and the existance of a well-resourced campaign by our adversaries to create and support misunderstanding of the means and ends of this confrontation. However, the greatest obstacle to an institutionalized understanding is our tendency to think and act in a manner appropriate to more traditional forms of conflict. We attempt to make the various forms of low-intensity conflict fit the same successful prescriptions we use to deter conventional and nuclear war. Our reliance upon these traditional structures and solutions impedes the development of specific policies and policy instruments.

How does one begin to bring understanding to this complex issue? Where does one start? How, in a world that is crowded with demands on our limited personal and national resources, a world of rival priorities, does one strike the balance that will provide the requisite defense? One of the project's major goals was to demonstrate that this ambiguous form of warfare can, in fact, be understood. It began by tackling the contentious issue of defining the term "low-intensity conflict."

During the conduct of the project, JCS approved the following definition. While the definition does not specifically mention military objectives, it does provide a foundation to focus on both civil and military activities, to include the employment of special forces and tailored conventional forces in low-intensity conflict.

> Low-intensity conflict is a limited politico-military struggle to achieve political, social, economic, or psychological objectives. It is often protracted and ranges from diplomatic, economic, and psychosocial pressures through terrorism and insurgency. Low-intensity conflict is generally confined to a geographic area and is often characterized by constraints on the weaponry, tactics, and level of violence.

Low-intensity conflict is not an operation or an activity that one or more of the departments of the United States government can conduct. Rather, it is, first, an environment in which conflict occurs and, second, a series of diverse civil-military activities and operations which are conducted in that environment. While low-intensity conflict may be ambiguous, the specific activities are not. Despite their diversity, these activities, which fall outside the realm of conventional combat, share significant commonalities in their operational environment.

The project found that the low-intensity conflict activities could be identified and grouped into four distinct categories: insurgency/counterinsurgency, terrorism counteraction, peacetime contingency, and peacekeeping operations. Through these activities the United States can provide the following capabilities: diplomatic, economic, and military support for either a government under attack by insurgents or an insurgent force seeking freedom from an adversary government; in cooperation with our allies, protection of personnel, property, and institutions from terrorism; military presence, humanitarian assistance, noncombatant emergency evacuation, limited strike, and similar operations; and support or participation in peacekeeping operations.

The report provides the basis for responding to various threats by detailing how the above categories of activity, as well as their subordinate functions (for example, command and control and intelligence), ought to be accomplished. What is significant to note here is that the specific categories and functions can be identified and conceptually developed to provide the United States government the capability to defend interests threatened by this political violence.

This is only a beginning. Achieving full understanding requires serious and continuous evaluation of the peculiarities of the concepts and of each separate involvement. It requires sensitivity to both the political and military nature of the question. It also needs to incorporate the influence of the domestic environment--United States public opinion and institutional orientation, role, and capability--and it must consider the role of a variety of constraints.

In order to promote a broad understanding of the issues involved, a carefully created, sophisticated, and ongoing public diplomacy effort is necessary. The nature of the conflict is such that its principles are not often understood by the public or the agencies charged to deal with it. A sustained effort is needed to devise programs to teach what low-intensity conflict is all about.

UNITY OF EFFORT

Second only to our lack of understanding is our lack of unity in responding to the threats to our interests. Our adversaries combine a substantial collection of military, diplomatic, economic, and psychological forces to inspire and support low-intensity conflict. Therefore, we must counter ideas with ideas, force with force, diplomacy with diplomacy, and all must flow from a strategy implemented through a strong national unity of effort. Nevertheless, a degree of unity exists only at the individual country level. At the national level and on a regional basis, unity is lacking.

Regional and national unity is dependent on clearly stated policy and well-established strategy. While there are policy documents, except for combating terrorism, such policy is certainly not well known. It is not fully implemented with requisite national strategy documents, and the respective roles and missions for the departments and agencies are not adequately understood. A national strategy must be explicit and be understood to unify the numerous activities required of diverse government departments and agencies that must deal with different aspects of this threat.

Such strategy, clearly detailed for traditional warfare, is conspicuously absent in our response to various low-intensity conflicts. Who, for example, is responsible for a national effort in Central America? Ambassadors of specific countries? The unified commander responsible for the land mass? The unified commander responsible for the islands and oceans? The regional Assistant Secretary of State? The ad hoc interdepartmental task force? The National Security Council? Our responses to this threat are often piecemeal, disjointed, short ranged, and focused on a single event as opposed to the larger whole.

Without national direction it is futile to expect unity of effort. Lack of unity at the national and regional levels hampers every effort to defend threatened interests in the low-intensity conflict environment. A strong, synchronized civil-military effort is essential. The debilitating results of its absence are far-reaching: insufficient overall direction; preeminence of ad hoc organizations and responses; poor interagency/interservice coordination; inappropriate support systems and materiel; complex and cumbersome regulatory systems; grave institutional resistance to change; few dedicated resources; peacetime-oriented security assistance programs; inadequate national and regional coordination; and lack of joint doctrine and training. In sum, legitimate and dedicated guidance and support for low-intensity conflict activities are needed.

A comprehensive civil-military strategy must be developed to defend our interests threatened by the series of low-intensity conflicts around the globe. It must be crafted in comprehensive terms, not focused on a single conflict or on a single department. It must integrate all the national resources at our disposal, military and nonmilitary, lethal and nonlethal.

EXECUTION

Individual services and organizations lack procedures and doctrine to guide their efforts in the low-intensity conflict environment as tasked by the national command authority. Organizations and forces attempting to conduct such activities are left to modify a body of procedures developed for other types of conflict. Regardless of function (for example, logistics, intelligence, command and control), the operational experience of those tasked to conduct operations in the low-intensity conflict environment shows conclusively that existing doctrine is inadequate. More is needed than amending doctrine developed for other forms of conflict. The threat, the environment, and the required United States activities are often unique. Organizations operating in this environment need guiding principles and prescriptions.

Successful operations and activities have been conducted by the United States in various low-intensity conflicts. However, these limited successes are primarily the result of dedicated individuals and organizations achieving success not because of, but in spite of, the absence of a clearly defined low-intensity conflict strategy. While these successful efforts merit our highest commendation, they should not be construed as acceptable substitutes for institutionalized programs that are so desperately needed. The day of reckoning for American interests is at hand in the Philippines, in Central America, and in the Middle East; soon it may come in Southwest Asia.

Both joint and combined doctrine are necessary to efficiently employ and integrate our various policy instruments. This need is as great as, if not greater than, the acknowledged need for joint and combined doctrine for fighting conventional and nuclear war.

A closely related issue is the lack of training, organizations, and materiel specifically designed for low-intensity conflict operations. Doctrine normally drives the development of military training, force structure, and materiel. The focus of the report, then, is to provide the basis for that doctrine and to supplement it with numerous nondoctrinal fixes which are identified in the sections of Volume II (for example, replacing ad hoc organizations with institutionalized organizations; integrating communications among agencies and services; increasing human intelligence capability; enhancing special operations forces).

SUSTAINMENT

The final theme of the report addresses two forms of sustainment: physical and moral. Logistical and programmatic support is lacking for both United States forces conducting the various low-intensity conflict activities and for threatened allied third world organizations and governments.

One of the major difficulties the United States has in supporting third world forces, for example, is an equipment inventory that is ill-suited to the local government because it is too complex, too expensive, or inappropriate. Nowhere is this more evident than in the need for a simple reconnaissance air platform for counterinsurgency.

Often the primary United States role is providing support to an ally in his struggle. Since this means indirect United States involvement, it requires an effective program of assistance in the form of training, materiel, and other support. The unique requirements and the diversity of host governments and organizations require that a dedicated research, development, and acquisition (RDA) program be developed to enhance our assistance efforts. Failure to provide the requisite support increases the probability that combat forces will be needed to protect our threatened interests.

Current legislation greatly restricts our ability to effectively assist developing nations. Restrictions that require review include providing aid to nations which are in arrears in debts owed to the United States; assistance to indigenous police and internal security forces; and military authority to conduct civic action and humanitarian assistance programs.

Our forces are inadequately supported. Our RDA and sustainment efforts focus on supporting large combat formations on the battlefields of conventional and nuclear war. This is not wrong, but it is insufficient. A similar effort is required for low-intensity conflict.

In many cases, our whole sustainment philosophy of support needs to be reversed. Our logisticians, engineers, and medical personnel, for example, often become the nose, not the tail, of any direct United States involvement. Great ingenuity and nontraditional thinking are required to develop the doctrine and capability to "attack" with our traditional sustaining organizations.

Our involvements will often require perseverance and a long-term commitment. We must demonstrate to ourselves and to our allies the staying power to support those fighting for the very freedoms this nation was built upon and remains committed to today. We should approach the task of helping others help themselves with enthusiasm, not hesitancy. In the final analysis, this nation's own freedoms, our very freedom of movement, depend upon a world that largely supports these goals. Our unwillingness to support others in their fight only causes us to live in an increasingly dangerous world, with fewer and fewer options to defend our own society.

SUMMARY

Low-intensity conflict is one of the most important challenges facing the United States. Our interests are being threatened with alarming frequency by various forms of political violence subsumed under the heading of low-intensity conflict. The national command authority will continue to task government departments and agencies to intervene, short of conventional or nuclear war, to protect those interests.

Our current defense posture reflects our inability to understand the form and substance of this direct challenge to our interests. Our lack of understanding is manifested in a lack of unity of effort; lack of doctrine, training, organizations, and materiel to execute operations; and lack of a sustaining support system. Short of war, we have no strategy or comprehensive plan to address the challenges of political violence.

After a recent department-level low-intensity warfare conference, a senior Central American military officer stated, "I hope I am incorrect in my assumption that, from what I've heard here today, the United States doesn't have a comprehensive strategic plan to deal with this threat that we confront today. If that is in fact the case...you don't have much time left." It is ironic that the essence of the problem can be so succinctly summarized by a foreign ally--an ally looking to the United States for help in combating insurgency and terrorism that threaten the survival of his country and our own national interests.

This report represents an initial effort at making a critical, civil-military analysis of our national capability to protect interests threatened by political violence associated with low-intensity conflict. It establishes a start point for the joint, combined, and multiagency approach necessary to understand and cope with this form of conflict. It was not designed to examine the range of government and national activity and to recommend those few relevant "fixes" that would settle this bothersome problem once and for all. As such, the project is not a blueprint but a dialogue. Its success cannot be measured by whether or not, as a single document, it tells us now and forever what to do. Although it contains over sixty specific recommendations on a range of issues, it is not the final chapter. The effort to respond to this conflict cannot end with these pages. If the project invites enlightened debate, sustained concern, and serious effort then it will, in part, have succeeded. In this sense, the project is not a prescription but an invitation.

For more than thirty years our shortcomings in low-intensity conflict have persisted. We should not expect the findings of this ad hoc, short-term project to solve all our problems. But our chance at arriving at a practical answer that capitalizes upon our political and military assets is much greater now that we have demonstrated our will and our ability to directly address this difficult issue. Action must follow. We will need both the courage to depart from conventional institutional norms and the vision to maintain a pragmatic defense posture increasingly relevant to a world characterized by neither war nor peace.

Mr. **Koch**. No sir. I wrote that letter as you indicated in advance of the passage of the legislation. At the time, it was not clear whether we would have legislation and you yourself indicated that earlier on that it had been your intention to make this nonbinding and leave it to the Department to find its own way through it and came to the conclusion that it could not be left to its own devices and had to be guided through it. And so you took the appropriate course of action. And so I felt at the time as I feel now.

Senator **Cohen**. But it is still your assessment that there is an attempt made to at least suffocate the child, even after it has been created by congressional mandate?

Mr. **Koch**. Well, I think what I said in a rather long winded way at the beginning is that if this initiative is not well launched from day one, then it is going to be stunted and crippled in various ways and we are going to have to go back and look at it somewhere down the road. You don't just go back, as you well know, and make mid-course corrections. What is required is a total rescrub of this whole thing and it will all be opened up. And are we going to have the same configuration of forces at that point as we have now to get this job done.

Senator **Cohen**. Is the new special Assistant Secretary of Defense going to be at a disadvantage, having a portion of his staff already selected?

General **Meyer**. Depends upon who the portion of his staff that has been selected are. If he doesn't say to the Secretary of Defense when he accepts the job that he has the right to go in and accept people or remove people, then he ought not to be the Assistant Secretary.

Senator **Cohen**. Is there any problem, General Wilson, do you agree with that?

General **Wilson**. I concur completely.

Senator **Cohen**. Any problem that you envision having half the staff located outside the office, is that a problem?

General **Meyer**. Well, it is better to have them all together. But if they can't be all in the Pentagon it would be okay to have the resource people and the research and development people a subway ride away.

It isn't like you are that far away. I don't believe this should be a major sticking point as long as the Assistant Secretary of Defense and his critical operational people are in the Pentagon where they can be interface with the people that they need to in order to be influential.

General **Wilson**. That may lower daily operating efficiency by 8 or 10 percent. It is critical that the people who are involved in the decision making process in operational matters be in the Pentagon and near the National Military Command Center as well as near the Assistant Secretary.

Senator **Cohen**. Senator McCain raised the issue that perhaps it would be better to have the command located outside the Washington bureaucracy. Then they would be able to function more efficiently and effectively rather than here.

General Wilson, do you have a different opinion?

General **Wilson**. I welcome the opportunity to comment.

Senator **Cohen**. You are glad I asked that question?

General WILSON. Yes, I am glad you asked that question sir. On December 23, Admiral Crowe sent General Thomas Kelly down to my farm in Southside, Va., to explore, and discuss the desirability or possibility of the new command's functioning effectively from MacDill Air Force Base, given the disestablishment of REDCOM and the availability of $60 million worth of facilities in place, including communictions and so on. I was simply being asked for an advisory opinion.

My response was that while it would not be the preferred way to go, it could be made to work, if certain criteria were met. Then, I gave—I knew the question was coming—some rather lengthy criteria.

The most important one was that there be, as General Meyers already indicated, that there be a strong presence for the Special Operations command in the Washington area—either the commander or his deputy with a strong operational staff.

The legislation specifies or rather implies that, in most instances, contingencies involving Special Operations Forces will be handled by the overseas CINCs supported by the Special Operations command. But, if the record of the past 25 years or so tells us anything, there is a marked tendency to run these types of operations from the Washington level. The President simply chooses, or the Secretary of Defense chooses, for reasons of political sensitivity or what have you, to run the operation from here. I believe that tendency continues, and that there will be a larger proportion of operations run from here than by the overseas CINCs, despite the wording of the present legislation.

That being the case, it is imperative that the Secretary of Defense and the Chairman of the JCS, that the national command authorities, have at their elbows people who know this business in detail, people who can ensure that we do not make bad mistakes in some kind of crisis situation. This concern applies particularly in the present era of micro-management. That requires a strong presence for the CINCSOC here in the Washington area, even though his major headquarters can comfortably be at MacDill.

General MEYER. And I would add one thing to what Sam Wilson said, and that is even if it is not run centrally, even if the national command authority decides that CINCEUR is to run the operation in Kinshasha, the advice on what sort of forces from the Special Operations Command might be of assistance to the commander in Europe in conducting that operation, would have to be immediately available. So even under such a command arrangement we would need very high level representation of the SOC here.

Senator COHEN. My time is up.

Thank you, Mr. Chairman.

Senator KENNEDY. Let me, if I could, ask you about the criteria which you would use in order to commit the Special Operations Forces. This has to be a matter of concern, certainly to the Members of the Senate and to the American people.

What could you tell us about it, General Meyer? When should we commit these individuals, and when should we expect that they might be committed, under what circumstances?

General MEYER. Well I would expect that Special Operation Forces would be committed today.

Senator **Kennedy**. I am talking about overseas.

General **Meyer**. I am talking about overseas today. Elements of civil affairs and other civic action type organizations that might be of assistance in countries that are in a developmental stage today. Security assistance or psychological operations people might be of assistance in countries around the world that are having internal problems. Special Forces who might be sent to various nations to assist in training. All of these forces are part and parcel of our day to day worldwide operations.

Some of those forces would be committed during period of near peace or near war, however you want to define it today. So there would be Special Operations Forces committed on a continuing basis.

The activities of the counterterrorist force, which is a part of this command, are oriented toward responding to terrorist acts. There are things that they can do in preempting terrorist acts overseas, which they could be involved in on a regular basis.

So as you go through the various portions of that force, there are ways in which they could be involved today.

In low intensity conflict, where you have insurgency, there might be forces that are provided to assist in providing intelligence, in providing logistics assistance, or in providing medical assistance to the local countries.

So it's a whole panoply of capabilities that runs all the way from day to day operations through counterinsurgency.

Senator **Kennedy**. What would be your candid assessment of our capability today?

General **Meyer**. It is extraordinarily poor.

It is poor because we haven't orchestrated it as I pointed out, the doctrine for low intensity conflict hasn't been written. We have to send in soldiers from Special Forces perhaps to do things that we could do better with our security assistance people, or we could do with Voice of America, or we could do with economic assistance or we could do in a host of other ways if it were properly orchestrated.

But there is no basic doctrine that integrates it to make sure that the intelligence that is available in the region is available to everyone and passes that intelligence from the State Department and the Agency and the defense elements there adequately. It is a void.

Senator **Kennedy**. General Wilson and Mr. Koch, would you comment, or do you subscribe to that?

General Wilson. I subscribe to what General Meyer has said. Additionally, it is clear that the direct action deployment of Special Operations Forces in small numbers in a contingency situation where U.S. lives or property had been placed at risk becomes a command decision to be made at the highest political levels. It is fairly obvious, I think, that those deployments occur when an emergency response is dictated.

On General Meyer's comment regarding doctrinal deficiencies, I would simply emphasize as I mentioned a moment ago the fact that we have a serious deficit as far as joint doctrine is concerned. And the situation becomes equally serious when we get to the level of interagency considerations of doctrine for low intensity conflict. We are in trouble there as well.

Senator **Kennedy**. We are going to have to recess. We will have just a quick question from Senator Cohen and then we will come back.

Senator **Cohen**. If you could just tell me what your understanding is of what happened to CENTCOMs liaison operation here in Washington, General Meyer.

General **Meyer**. As I understand it in talking to General Kingston, he had a very small liaison office here and then after a while it started to dry up.

General **Wilson**. That is my understanding also. And what I have been trying to describe to you in this case, sir, is not a liaison office. It is what General Dick Stilwell calls an "advance tactical CP."

Senator **Cohen**. Mr. Koch, what happened with the liaison operation?

Mr. **Koch**. I have never heard of it, Senator. I have never met anybody from it or dealt with anybody from it. I think it is a shadow operation, I guess.

Senator **Kennedy**. All right, we will recess. Thank you.

[Recess.]

Senator **Kennedy**. We will come back to order. I think we are going to have a series of more votes as well through the afternoon and evening, and so we will have a short period of time and then perhaps we could submit some of the other questions that the members have.

I did not ask Mr. Koch whether he had anything he wanted to add to the earlier question and response that we had from General Wilson and General Meyer with regards to the criteria of when we should be involved in the commitment of the Special Operations Forces.

Is there anything you would want to add?

Mr. **Koch**. Yes, I would, without disagreeing with my colleagues I would just say added to what was pointed out, the question of deployment that we have in fact today, Senator, a disproportionate number of Special Operations Forces in the field doing the kinds of jobs that General Wilson referred to in the area of civic action and foreign internal defense. That is partly a result of legislation which limits the number of U.S. forces that we are allowed to have in the field on a permanent basis. So we make a very heavy use of mobile training teams.

Because of the peculiar skills of our Special Operations Forces a very large number of those teams are made up of the Special Operations people.

Now as regards capacity, and without talking about hardware, but let's talk about the ability of these men to do the job that we want them to do. It is extremely limited, as much as we laud them and as much as we care for them we discover that in the area of language capability, which is absolutely critical, that there is no place in the world where we can field more than one A team, with the exception of Latin America. We just don't have the language capabilities.

Finally, to the point of doctrine, this is a long running, almost theological issue, how do you get to a doctrine, at what point do you begin? General Meyers instructed me on this in the past and I understand what he says, but I still do believe that at some point in this thing, you have to have a policy that you begin with. And out of that policy you get a strategy and out of that you get the tactics and implement the strategy and so forth; somewhere doctrine comes in. It doesn't stand by itself. Until we have a policy, we don't have today, we are dealing with this question of freedom fighters, we are backing into something that 20 or 30 years ago we called roll back without our having any real sense of how we are getting into it or what we want to be doing when we get there.

I think we have a case of the shorts in all three areas.

Senator KENNEDY. General, in the areas, of intelligence, civilian affairs, Special Forces antiterrorist activity, and medical teams, what kind of capability do we have at the present time?

General MEYER. We have a very limited capability.

Senator KENNEDY. Do you think there is going to have to be a significant increase in the capability in each of the areas plus other areas? Are we going to have to develop new kinds of training skills and new training?

General MEYER. Each one of the segments that we are talking about is going to have to be looked at in the context of what we want to be done in that particular region.

We are going to have to develop the policy, and the strategy, and the doctrine tactics, the training, the people, to be able to do that. That is going to be a tremendous challenge for the commander of the Special Operations Forces.

General WILSON. Might I add a comment, Senator.

You may recall visiting a couple of Special Forces base camps in Vietnam in 1965. I would have to say to you that the individual skills and capabilities of similar Special Forces teams today are significantly less than what you saw some 20 odd years ago in Vietnam. I would note that particularly in the area of linguistic proficiency, we have slid backwards significantly to where we no longer can field Special Forces "A" detachments where all members have some level of linguistic skill. We are lucky if we have one or two in a detachment who has say an S-2 or an R-2 capability in a foreign language.

Senator KENNEDY. Well I think, I have had a recent opportunity to visit the Special Forces up at Fort Devans, and there is no question as to the willingness and the desire of those men to be the best.

There is no question that they need additional support and additional guidance. I am convinced, as I am sure all of you are, that we have the personnel that are prepared to do it, if we give them the kind of support in these areas which I think have been identified.

General MEYER. Mr. Chairman, there is one place that you could go and you could see that being carried out, and that is if you look at our counterterrorist force where those forces have been given unique training, unique resources and so on. You can see what can happen if you are willing to provide the focus.

Senator **Kenndy**. I was down there a year ago as well. That is enormously impressive.

Is there anything that we ought to reference in terms of what some of the other countries are doing in developing these kinds of skills?

Are there any lessons that we ought to learn from any of the other countries that would be of value?

COUNTERTERRORIST FORCE

General **Meyer**. I will speak on the counterterrorist force, and you can ask the others to speak to low intensity conflict issues. As far as the counterterrorist forces are concerned we have made a conscious effort to let advice from the Special Air Services, the GSFG–9 from Germany, the Suretée, the Israeli forces, the Italian forces and others. There has been a good exchange of both technological data and intelligence operational data in that very narrow counterterrorist area.

But as far as the low intensity conflict area, the broader issue that we are talking about here has not occurred.

Mr. **Koch**. I would say in the area of counterterrorism Senator, foreign forces have two advantages over our own. One, as was mentioned earlier, I think by Senator Cohen, their leadership, their political leadership at the top level exercises with those forces and there is no substitute for that kind of understanding at the political level command and control system of what is to be done.

The other is, very simply that they are close to the problem. Most of these difficulties, terrorism does not occur much in this country. It is in Europe, it is in the Middle East. And their forces are much closer to it, so they don't have the difficulties we have consistently of getting our people in place to operate.

General **Meyer**. I would reinforce the point that is made there, and that is if there is anything that impresses me, it is to see the home secretary, the foreign secretary, the prime minister, the head of the SAS, the head of the Scotland Yard sitting down every 3 months and going through a scenario, a terrorist scenario, either in Great Britain or somewhere else. So that when an incident occurs they don't have to go through the whole sniffing process.

General **Wilson**. If I might add to that.

During the recess I wrote one single little note that happens to be on this very subject. It pertains to the importance of a strong knowledgeable institutionalized presence in this field at the White House level that is capable of orchestrating diplomatic efforts, coordinating and controlling sensitive supporting intelligence operations in this area, handling the related business of releases to public media and so on. There is an interagency problem, Senator, in that we don't know how to play the game on an interagency basis effectively. We do it on a completely ad hoc basis, interagency-wise.

So things are not going to work well until we institutionalize something that the legislation does call for at the White House level, at the top executive level. The legislation asks for a board and states the sense of the Congress that there be a deputy national security advisor on the subject. Neither of these has really happened. Unless or until that institutionalization takes place, we are essentially headless politically and doomed to play an ad-hoc game.

Senator **Kennedy**. That is a good reminder.

There used to be a position where we used to go outside, even of Special Forces, to have people that run certain kinds of operations. The most obvious one was the Iran situation.

Do you think those days are over?

General **Meyer**. I didn't understand the first part of that.

Senator **Kennedy**. Well we went outside of the Special Forces or whatever we had in terms of capability (Rangers or Marines), and we went outside of the structure of personnel or organization to try and take someone outside of what might have been considered to be the Special Forces Operations.

General **Meyer**. Having been involved in that operation from the start, it was necessary to ad hoc it the whole way through. And as a result some of the problems that existed at Desert 1 occurred.

If we had trained, skilled helicopter pilots flying who had flown those types of missions over time, the Desert 1 accident would have been less likely to have occurred. So I do not believe I would ever want to send a group that you pulled from all of the segments of the conventional forces and threw together at the last minute. That is not the way to do a professional job in this arena.

Senator **Kennedy**. The point that was raised earlier during the course of the hearings was on the civilian control.

We have seen the limits that have been placed by law on military service. For example DOD political appointees. The Secretary of Defense 10 years, Deputy Secretary 10 years, Under Secretary of Defense for Policy 10 years, Service Secretary 5 years. This was obviously as a result of the interest and concern about civilian control.

I do not think there is any question or doubt, nor have I ever heard it raised even when they were giving some thought to the kind of legislation, about the loyalty of the military personnel. The question is how do you ensure the constitutional mandate of civilian control, and how is that considered.

Should the Assistant Secretary be someone who is right out of the service, or is on active duty and then selected for this?

General **Wilson**. Senator, I would suggest that that should be a waiverable position.

Senator **Kennedy**. For the right person.

General **Wilson**. We would have——

Senator **Kennedy**. Well I am thinking more now of policy rather than any particular individuals. I mean just in terms of the policy questions.

General **Wilson**. Well, if we had had that policy in the late 1940's we would have denied ourselves the services of General George C. Marshall as Secretary of Defense. And I don't think anyone would say that he was not qualified across the board to assume that kind of responsibility.

So I understand the sensitivity, and I am not offended by it personally, but I wonder concerning its necessity and whether or not a provision that it could be waived under certain circumstances might not be appropriate. It is the talent, it is the individual you are looking for in this particular case, not so much how he meets a certain litmus test, it seems to me.

General **Meyer**. My view is similar to General Wilson's.

It also is that we ought to look a little bit differently at this particular Assistant Secretary of Defense, because he has a unique role to play. I am not sure how a civilian might have the kind of background and experience in this particular milieu that you need to be the Assistant Secretary of Defense for Low Intensity Conflict. It would be an extraordinary person who came out of academe or came out of the Senate staff or came out of somewhere else, who really understood all of the facets of this particular sort of warfare.

If you could find such a civilian, I would have no objection to him being there. But it seems to me that as this thing starts, we ought to be darn sure that we get the kind of person that has a background and experience in this area and if he happens to be military, so be it.

Mr. **Koch**. I do not have a great deal to add to that Mr. Chairman.

AIRLIFT CAPABILITY

Senator **Kennedy**. There are just a couple of final areas, and I want to get them in before I will have to adjourn the meeting. One is on the airlift capability of our force. I am just wondering what Mr. Koch might have to say about the Air Force plan, whether it is adequate in terms of airlift for Special Operations.

Mr. **Koch**. Yes it is adequate as it reads. The question is whether it will be implemented. We have had, we are talking about requirements which were validated and the need for them established as far back as 1980 and each year along the way we have pressed for the Air Force to meet these requirements. Each year we have been told the check is in the mail and each year the plans have gotten better.

So we have continually improving plans, but we never have planes to go with them. In 1984 we had an agreement that the Army would take over the Special Operations rotary wing mission. This has been an absolute disaster from the beginning. The Army did not at that point have the capability to do that, insisted that it did and nearly a year later were still trying to convince the leadership that it had the capability.

Senator **Kennedy**. Each of you take a minute if you would.

What do you think that we can do on the committee that would be the most effective to make sure that legislation is carried forward? What do you think is the best way for us to ensure that it will be actually implemented?

General **Meyer**. My view is that you have to keep pressure on the Department. You need to develop a series of issues that you maintain oversight of so that you are sure you are getting into the critical areas that are going to let you know whether or not the force is being developed adequately. I think you need to review these issues with the commander of the SOC, with the Assistant Secretary of Defense, and with several unified commanders.

I would strongly recommend Mr. Chairman that you bring in General Galvin.

General Galvin is going to take over as the commander in Europe. He understands low intensity conflict better than anyone else in the service. If he can't make the new organization work, nobody can. And he can tell you whether it will or it won't work and how to fix it if its broken.

Senator **Kennedy**. Does anybody else have anything to add?

Mr. **Koch**. Just to answer briefly Mr. Chairman, what you need to do to get it done is to hold people's feet to the fire. The reason you have Program 11 is because you have a hearing. So you have people that won't take a bath until they have a heavy date. I suggest you have hearings on it on a fairly regular basis and you will get something done.

General **Wilson**. My only other comment would be when they are doing something right, give them credit, Mr. Chairman. The attitude from over here is a critical one, and in many ways justifiably so. But there are some things beginning to go right, and I think they need to be recognized.

Senator **Kennedy**. Thank you very much for very instructive and helpful testimony for the committee and I am certain the other members of the committee are going to keep in touch and call on you continuously. We want to thank you very much for your testimony.

[Question for the hearing record, with answer supplied, follows:]

QUESTION SUBMITTED BY SENATOR WILLIAM S. COHEN

Senator **Cohen**. In the aftermath of the Karachi airliner hijacking incident, some Members of Congress expressed concern regarding the distance of U.S. counterterrorist units from their most likely areas of operation. Are U.S. counterterrorist units now being [deleted]. If not, is this under consideration? Have other steps been taken to reduce the response time of these units?

Mr. **Armitage**. The Joint Chiefs of Staff share the concern of Congress over the time reuired to transport U.S. counterterrorist units to likely areas of employment. [Deleted.]

[Whereupon, the committee adjourned at 4:40 p.m.]

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